2023-1-SI01-KA220-HED-000166987
(Application form ID: KA220-HED-EF096731)

TRANSFERABILITY GUIDE

Lessons Learned, Policy Recommendations, and Transferability Criteria

Project Title

Ergonomic workplace design for workers with disabilities and their long-term employment

Project Acronym: **ERGOART**

February, 2026

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1 Introduction

The Transferability Guide is one of the key outputs of Work Package 5 (WP5) of the Ergoart project and represents a strategic tool for the dissemination, adaptation, and long-term use of the project's results across different national and institutional contexts. Its purpose is to ensure that the approaches, training models, tools, and policy recommendations developed within the project are not limited to the partner countries, but contribute to systemic change in the field of inclusive employment beyond the project's lifetime.

The Ergoart project addresses structural barriers faced by persons with disabilities when entering and integrating into work environments, particularly within the cultural and creative sectors, where the need for workplace adaptations is often underestimated. The diversity of legislative frameworks, institutional practices, and support mechanisms across European countries requires a thoughtful and evidence-based approach to transferability. This guide therefore identifies key conditions, success factors, and risks that influence the effective transfer of project outcomes to different contexts.

The document is grounded in empirical evidence gathered through pilot activities, evaluations of training programmes, partner collaboration, and stakeholder consultations. It is positioned within a broader European and international framework, drawing on the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), the International Classification of Functioning, Disability and Health (ICF), and relevant European Union policies and strategies.

By defining clear transferability criteria and providing concrete recommendations, the guide supports policymakers, education and training organisations, employers, and other key stakeholders in adapting and implementing Ergoart project results within their respective environments. In doing so, it contributes to reducing inequalities, strengthening accessible and inclusive working environments, and promoting sustainable employment opportunities for persons with disabilities at the European level.

2 About the Project

As part of the European Commission's Erasmus+ programme, a project entitled **"Ergonomic workplace design for workers with disabilities and their long-term employment"** (ERGOART) was launched in September 2023. The ERGOART project focuses on finding solutions to improve existing curricula in higher education and later provides a systematic approach to teaching and knowledge sharing for other local educational institutions.

The aim of project was to obtain detailed information on the current situation of people with disabilities in general and specifically in the cultural sector in various countries and in Slovenia. In depth study analyse examples of good practise in the employment of

people with disabilities in the cultural sector, to serve as model concepts for educational institutions.
The objectives of the project are (Figure 2.1):

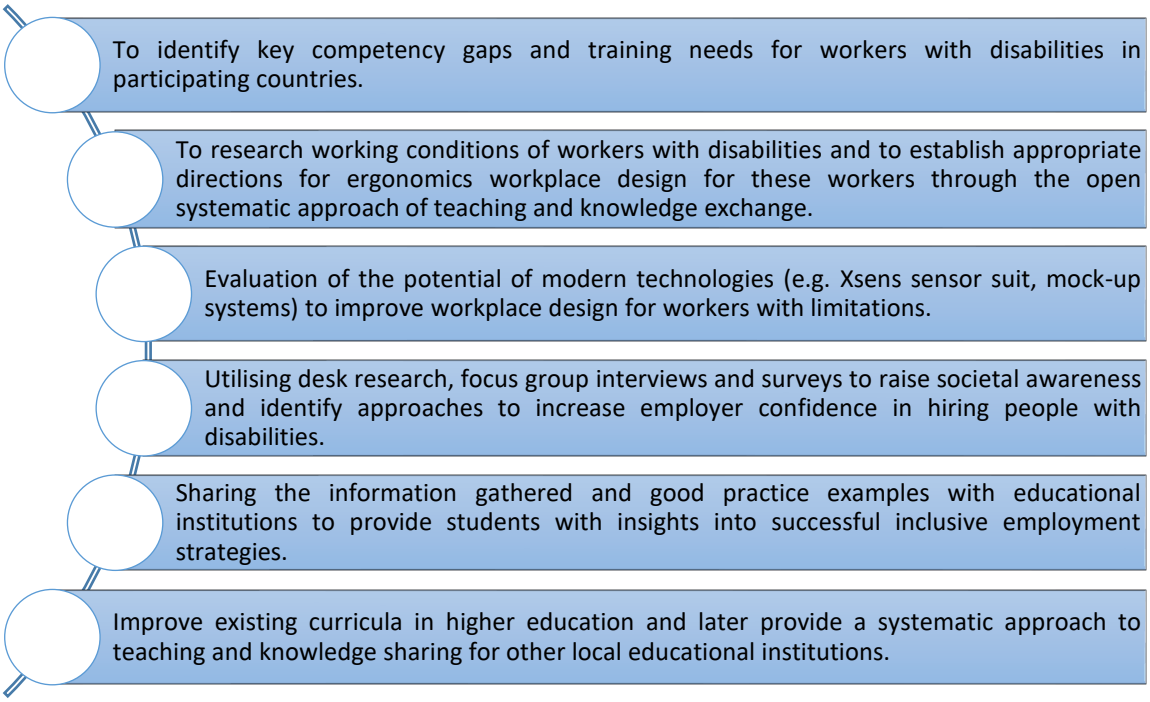

Figure 2.1: Key Objectives of the ERGOART Project

The project will be completed by the end of February 2026.

3 Transferability Framework

In the context of the ERGOART project, transferability refers to the ability to apply, adapt, and further develop the project's educational materials, methodologies, technological tools, and ergonomic approaches in different national, institutional, and sectoral settings. Transferability within ERGOART is not understood as a simple replication of project outputs, but as a flexible and context-sensitive process that enables meaningful use of results across diverse educational systems, labour market structures, and policy environments.

The project developed a set of transferable outputs, including structured learning content in the form of written teaching materials and presentation-based training modules, as well as practical methodologies for ergonomic workplace analysis. These outputs were supported by empirical testing using advanced motion capture technology (Xsens sensor suit), ergonomic assessment methods, and digital simulation tools such as Xsens MVN and Process Simulate. Pilot testing was carried out with both persons with disabilities and non-disabled participants in a purpose-designed testing environment, and the results were presented and discussed with stakeholders during round table events.

4 Overview of Training Modules

In the following section, the five training modules developed within the ERGOART project are presented in full. These modules represent one of the key mechanisms for the transfer and adaptation of project results to different national, institutional, and professional contexts. Each module constitutes a self-contained Manual for Trainers and provides structured guidance for the implementation of training activities in various educational and professional settings.

The slide-based structure of the modules has been retained to support direct implementation and facilitate the reuse of training materials by trainers in different contexts.

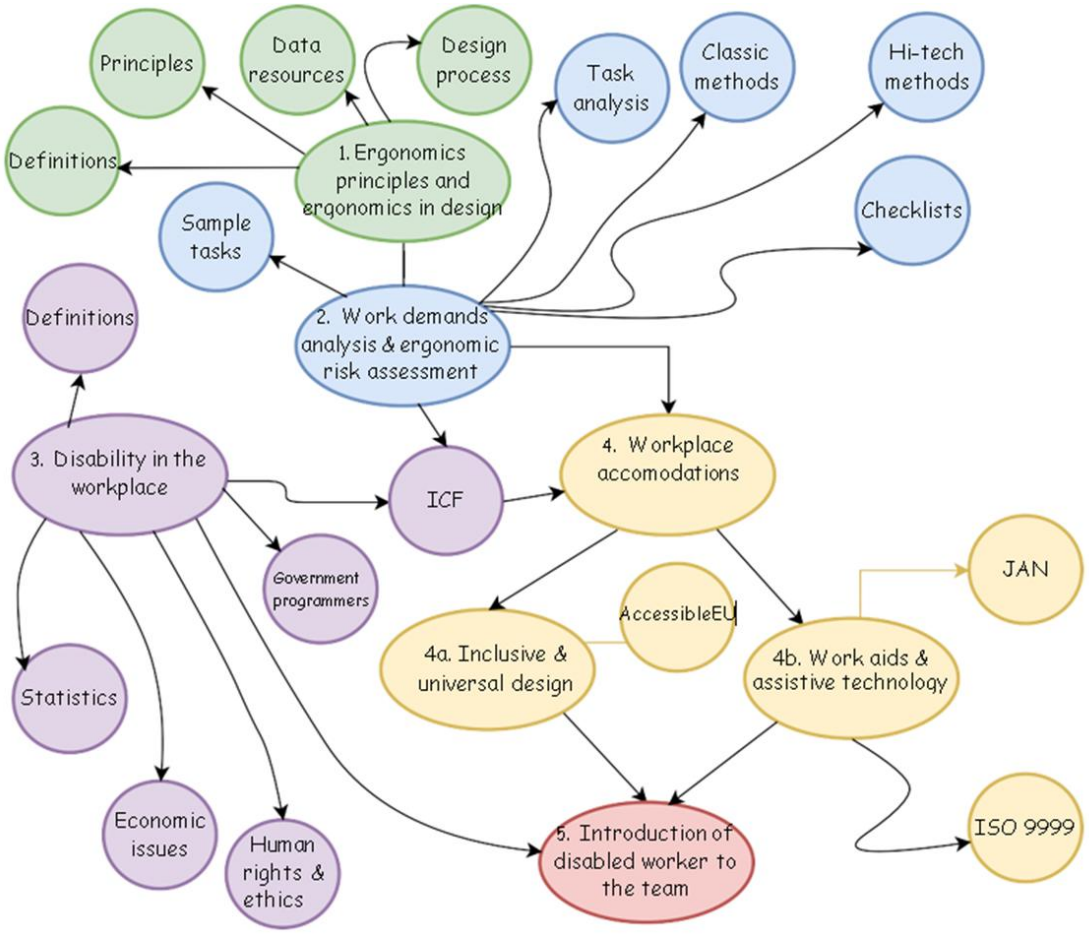

Figure 4.1: Overview of ERGOART training modules and their interconnections

The figure 2 presents an overview of the ERGOART training modules and their interconnections. It illustrates the logical progression from ergonomics principles and work demands analysis to disability-related topics, workplace accommodations, inclusive and universal design, and assistive technologies. The diagram supports a holistic understanding of the training structure and highlights how individual modules build upon each other to support the inclusion of persons with disabilities in the workplace.

4.1 Ergonomic Principles & Ergonomics in design

Content Area 1: "Ergonomics Principles & Ergonomics in Design" includes 1) lecture slides, 2) a text document that expands on the lecture content, and 3) a homework task.

The ErgoArt consortium envisions that the text document can be used as pre-lecture reading or as a supporting resource for students who were absent from the lecture.

Homework Task

Scenario: Anna, 38 years old, uses a wheelchair and experiences muscle atrophy. Her employer has made some accommodations for accessibility, such as installing ramps and providing a disabled bathroom. However, Anna faces challenges in the workplace kitchen:

- The countertop is too high for her to reach the microwave to heat her lunch or access the sink to wash dishes.
- As a result, Anna must rely on coworkers to assist her, which limits her independence during lunch breaks.
- Anna desires a kitchen setup that allows her to manage her lunch break independently, without needing assistance.

Task:

Using the design process outlined in the lecture, propose a solution to Anna's problem. Your response should:

1. Identify the Problem: Summarize Anna's challenges and their implications on her workday.
2. Define the Target Population: Highlight Anna's specific needs as part of the workplace population.
3. Analyze the Task: Describe the tasks Anna performs in the kitchen and the barriers she encounters.
4. Propose Solutions: Develop potential design changes to the workplace kitchen that address Anna's accessibility issues. Consider factors such as countertop height, microwave and sink accessibility, and ergonomic principles.
5. Evaluate Feasibility: Assess how practical and effective your proposed solutions are in improving Anna's independence and quality of life at work.

Deliverable: Submit a brief report (300-500 words) outlining your solution. Include sketches, diagrams, or examples where possible to clarify your design.

Ergonomic Principles & Ergonomics in design – Seminar slides

(Slide 7)

Objective: Engage the audience and introduce the concept of environmental modification as a natural process shared by humans and some animals.

1. **Start with a question:** Ask the audience, *"What do humans and beavers have in common?"*
   - Allow a few moments for students to think and respond. Encourage participation to make the discussion interactive.
2. **Explain the connection:** Highlight that both humans and beavers modify their environments to suit their needs.
   - For example, humans build houses, bridges, and cities, while beavers construct dams to create suitable habitats.
3. **Expand the perspective:** Emphasize that humans are not unique in this behaviour—other animals, such as birds building nests or ants creating colonies, also adjust their environments.
4. **Link to ergonomics:** Conclude by pointing out that making adjustments to the environment is natural and essential for survival. This sets the stage for understanding how humans use ergonomics to design environments that fit their needs effectively and safely.

(Slide 8)

Objective: Establish a shared understanding of ergonomics and its scope.

1. **Engage the students:**
   - Begin by asking students to share their own definitions of ergonomics or suggest keywords they associate with the term.
2. **Present the IEA definition:**
   - Display the International Ergonomics Association (IEA) definition of ergonomics:
     "Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and methods to design in order to optimize human well-being and overall system performance."
   - Highlight that the terms **"ergonomics" and "human factors"** are often used interchangeably or together as a unit.
3. **Explain the definition:**
   Break down the key aspects of the definition for clarity:
   - **Dual nature of Ergonomics:**

- Ergonomics is both a **scientific discipline** and a **professional practice**.
- As a discipline, it studies human interactions with tools, machines, environments, or processes to understand human capabilities and limitations in specific contexts.

- **Application to design:**
  - As a profession, ergonomics applies research (theory, principles, data, and methods) to design systems, products, and environments.
  - The focus is on improving both **human well-being** (e.g., safety, comfort, and satisfaction) and **system performance** (e.g., efficiency, reliability, and productivity).
- **Human-centred approach:**
  - Ergonomics ensures systems are designed to fit human needs rather than forcing people to adapt to poorly designed systems.
  - It considers physical, cognitive, and organizational factors to create solutions that benefit individuals and improve overall outcomes.

4. **Encourage Reflection:**
   - Ask students to reflect on how this definition aligns with their initial ideas or keywords.
   - Discuss how ergonomics goes beyond physical comfort (e.g., chairs or keyboards) to encompass a broad range of human-system interactions.

(Slide 9)

Objective: Expand on the "profession" aspect of the ergonomics definition and establish a connection to ergonomic principles (covered in the next slide).

1. **Revisit the Definition:**
   - Remind students of the second half of the definition of ergonomics: *"…the profession that applies theory, principles, data, and methods to design in order to optimize human well-being and overall system performance."*
2. **Explain the Role of Data:**
   - Emphasize how the data ergonomists use helps us understand human limitations and capabilities:
     - **Anthropometry Data**: Explains the wide variety of external physical characteristics, such as various body dimensions and reach.

- **Physical and Cognitive Work Capacity Data**: Provides insight into internal human characteristics, like strength, endurance, memory, and sensory thresholds.
- **Environmental Needs Data**: Defines the values for physical factors (e.g., lighting, temperature, noise) that are necessary for optimal human performance.

3. **Discuss the Role of Methods:**
    - Highlight that methods are essential for understanding how humans interact with their environment and technology.
    - Explain that these methods are often used for **risk assessment** to identify and mitigate potential issues, such as musculoskeletal strain or cognitive overload.
4. **Bridge to the Next Slide:**
    - Conclude by pointing out that ergonomics involves more than just data and methods—it also applies **ergonomic principles** to guide design.
    - Mention that the upcoming slide will explore these principles and how they contribute to optimizing **human well-being** and **system performance**.

(Slide 10)

Objective: Introduce the four global ergonomic principles.

1. **Engage the Students:**
    - Start by asking students, *"What ergonomic principles do you already know?"*
    - Encourage participation and write down their responses to generate interest and discussion.
2. **Explain Global vs. Local Principles:**
    - Clarify that ergonomic principles can be applied on two levels:
        - **Global principles**: Broad, foundational guidelines that apply to the design of all work systems.
        - **Local principles**: Specific, task-focused principles that evolve with technological advancements and scientific discoveries in ergonomics.
    - Emphasize that the list of specific principles grows as the field of ergonomics develops and as work evolves due to technological progress.
3. **Introduce the Four Global Principles:**
    - Explain that there are four core global principles that should always be considered when designing work systems. These principles form the foundation for creating safe, efficient, and user-friendly environments. Do not explain the principles yet.

(Slides 11-14)

Objective: Explain and demonstrate the importance of identifying and describing the target population in ergonomic design.

Engage the Students:

- Start by asking, *"Why do you think it's important to consider who will use a system, product, or service during the design process?"*
- Encourage students to share their thoughts and examples.
- Conclude with famous ergonomics truth Fit task to human not the opposite. The next two slides show what kind of adjustments would human body need to go through to survive a car accident (slide 12) to use a laptop computer without strain on neck (slide 13).

Issues to cover:

- Explain that ergonomics focuses on designing for a specified target population rather than trying to accommodate every individual.
- Stress the importance of fairness and inclusivity in design, avoiding discrimination based on gender, age, or disability. Reference standards like ILO Convention No. 111 to reinforce the global commitment to equality.
- List the relevant human characteristics that often needs to be considered
- Explain that designing based on averages often fails to meet most users' needs. Discuss how ergonomics typically aims to accommodate 90% of users by using the 5th and 95th percentiles for key characteristics.

(Slides 15 & 17)

Objective: introduce the terminology and concept of task-oriented design.

The slides contain all the necessary information, and there is nothing additional to include. Please note that the actual procedure of task analysis should not be covered at this point of the presentation.

(Slide 18)

Objective: Explain that understanding the environmental context is crucial for effective design

Explain that the physical environment encompasses factors such as temperature, lighting, noise, spatial layout, and furniture. These attributes directly influence the usability, safety, and comfort of a design. The organizational and social environment includes work practices, organizational structures, and cultural attitudes, all of which can impact on how people interact with the design.

(Slide 19)

Objective: Explain the importance of evaluating design success using established ergonomics criteria and emphasize its role in creating effective, human-centered solutions.

Start with a Question:

- Ask the class, *"How can we tell if a design is truly successful?"*
- Encourage students to share their thoughts, focusing on aspects like usability, safety, and satisfaction.

Introduce the Concept of Criteria-Based Evaluation:

- Explain that evaluating a design's success requires clear and established ergonomics criteria, regardless of whether the design process followed an ergonomics-based approach.
- Highlight that these criteria ensure designs meet human-centered goals and perform effectively in real-world contexts.

Explain the three Key Areas of Ergonomics Criteria

1. Human Performance:
   - Does the design help users complete tasks effectively?
   - Does it improve their skills, abilities, or knowledge?
2. Health, Safety, and Well-Being:
   - Does the design minimize risks and support physical and mental health?
   - Does it enhance comfort and safety?
3. User Satisfaction:
   - Is the design enjoyable, intuitive, and user-friendly?

Discuss Context-Specific Priorities:

Explain how the importance of these criteria depends on the type of design:

- For consumer products, user satisfaction is often the priority since usability and enjoyment drive market success.
- For work systems, health and performance are more critical to ensure safety, productivity, and long-term well-being.

Highlight that evaluation is not a one-time task but an ongoing process integrated into the design cycle. Explain that designers should test and refine designs at different stages, using ergonomics criteria to identify and address issues early.

(Slide 20)

Objective: Describe the role of ergonomics in design.

The content is more or less self-explanatory. It's possible ask the students to bring examples each issue on the slide is necessary.

(Slide 21)

Objective: List the design phases. Each phase and the role of ergonomics in it will be discussed on separate slide.

(Slide 22)

The slide content is self-explanatory.

(Slides 23 & 24)

Objective: Explain the considerations behind function allocation and encourage critical thinking about how human and technological capabilities influence task assignment.

1. Introduce Function Allocation:
    - Begin by reading a brief description of function allocation, ensuring students understand that the term "system function" has a broad meaning—it refers to anything the system needs to achieve, whether physical, cognitive, or operational.
2. Engage the Students:
    - Ask students, *"What factors should we consider when deciding whether a human or technology should perform a function?"*
    - Encourage discussion and write down their ideas. Highlight that practical concerns, such as reliability and costs, often influence these decisions.
3. Key Considerations in Function Allocation:
    - Guide the discussion toward three main considerations:
        - Availability of Suitable Technical Solutions: Can technology reliably perform the task?
        - Safety: Which option—human or machine—is safer for both users and the system?
        - Cost: What are the costs of human labour versus the cost of implementing and maintaining technology?
4. Introduce Fitts' List:
    - Show students Fitts' List, which outlines the areas where humans and machines excel.
5. Engage Critical Thinking with Recent AI Advancements:

- Ask the students:
  - *"Which human advantages listed in Fitts' List have been overtaken by technology due to advancements in AI?"*
  - *"Which human advantages might soon be challenged by AI?"*
  - *"Can you think of any new advantages humans may have over technology that weren't relevant in the 1950s, such as empathy or ethical reasoning?"*

6. Connect to Changing Work Environments:
   - Encourage students to reflect on how the nature of work has evolved since Fitts' List was first created. For instance:
     - More collaborative roles between humans and machines.
     - The rising importance of human-centered qualities, like creativity and emotional intelligence.

(Slide 25)

The slide content is self-explanatory.

(Slide 26)

Objective: List the detailed design sub-phases. Each phase and the role of ergonomics in it will be discussed on separate slide.

(Slide 27)

Objective: Explain the interconnected nature of jobs and work systems and the importance of designing work organization to support performance and well-being.

1. **Introduce the Concept:**
   - Start by asking students, *"How do you think individual jobs and work systems within a company affect one another?"*
   - Explain that jobs and work systems are interconnected, and changes in one can create constraints or pressures on others, impacting overall organizational performance and worker well-being.
2. **Highlight the Broader Context:**
   - Emphasize that the design of work organization should consider both internal company factors (e.g., policies, production processes) and external influences (e.g., social, cultural, or regulatory factors).
   - Ask students for examples of how these broader factors might shape work organization (e.g., legal requirements for break times or cultural norms around teamwork).

3. **Evaluate Relationships Within the System:**
    - Discuss how elements like workspaces, workstations, and workflows interact and contribute to external workload.
    - Provide an example, such as how a poorly designed workstation could increase stress or reduce productivity by making tasks more difficult or time-consuming.
4. **Address Negative Outcomes:**
    - Explain that poor design can lead to issues like increased stress, decreased performance, or reduced worker satisfaction.

Highlight the importance of identifying these issues and considering alternative design solutions to improve alignment with system requirements and worker needs.

(Slide 28)

Objective: Explain the key principles of task design.

Note that the slide contains only bullet points, the explanation of each bullet point is provided below.

Make tasks meaningful: Ensure that each task contributes clearly to the overall goals of the work system and can be easily understood by the workers.

Create whole tasks: Design tasks as complete units of work, rather than fragmented pieces, so workers can see the purpose of their efforts.

Acknowledge worker experience and skills: Take into account the abilities, knowledge, and expertise of the people performing the tasks.

Incorporate variety: Include a mix of skills, activities, and responsibilities to keep tasks engaging and appropriately challenging.

Allow autonomy: Give workers some control over how they prioritize, pace, and complete their tasks.

Encourage skill development: Provide opportunities for workers to improve existing skills and learn new ones related to their tasks.

Promote interaction: Avoid isolating workers by ensuring they have chances for social and functional connections with others.

Balance workload: Prevent overloading workers, which can lead to fatigue and errors, as well as underloading them, which can cause boredom and dissatisfaction.

Reduce repetition: Avoid overly repetitive tasks that can cause physical strain, boredom, or a sense of monotony.

Provide feedback: Ensure workers receive meaningful feedback about their performance to help them stay engaged and improve.

(Slides 29 & 30)

Objective: Explain the key principles of job design. Stress that the goal for job design is to create roles that are efficient, safe, and manageable for workers.

1. **Engage the students:**

   - Start by asking, *"What do you think makes a job well-designed?"*
   - Encourage students to share ideas such as balance, clarity of tasks, or the right level of challenge.

2. **Introduce the purpose of job design:**

   - Explain that job design ensures roles align with the overall goals of the work system while balancing demands on workers.
   - Stress that the primary goal is to make jobs efficient, safe, and manageable to support both performance and well-being.

3. **Discuss compensating for task design limitations:**

   - Highlight that when individual tasks don't fully meet good design principles, job design helps fill the gap.
   - Explain how job design can address mismatches between workload and worker capabilities, avoiding negative effects like fatigue, strain, or frustration.

4. **Explain Factors That Influence Job Workload:**

   - Provide examples of key factors that impact the overall workload:
     - **Task Combination:** How tasks are grouped within the job.
     - **Repetitiveness:** Repeated tasks can lead to boredom or strain.
     - **Worker Control:** The degree to which workers can make decisions about how and when to complete tasks.

5. **Connect to Real-World Applications:**

   - Ask students for examples of jobs they believe are well-designed or poorly designed and discuss what makes them effective or challenging.
   - Share examples of industries where job design is critical, such as healthcare (nurses balancing patient care) or manufacturing (assembly line workers).
   - Show strategies to improve the quality of the job (slide 30), and ask if these could help to improve the poorly designed jobs.

(Slide 31)

Objective: Explain the importance of designing a work environment that minimizes negative factors, supports worker well-being, and enhances task performance.

1. **Engage the Students:**
   - Start by asking, *"What factors in a work environment can impact how well someone performs their tasks?"*
   - Encourage students to share examples, such as noise, lighting, temperature, or social factors.
2. **Introduce the Purpose of Work Environment Design:**
   - Explain that the work environment should minimize harmful effects from physical, chemical, social, or biological factors.
   - Emphasize that a well-designed environment supports workers' health, safety, and motivation to perform tasks effectively.
3. **Discuss Methods to Assess Conditions:**
   - Highlight the importance of using both **objective measurements** (e.g., noise levels, temperature) and **subjective feedback** (e.g., worker perceptions) to evaluate environmental conditions.
   - Stress the need to maintain conditions within recognized safety and health standards while considering task-specific needs.
4. **Provide Practical Examples:**
   - Discuss how the environment impacts performance:
     - Poor noise control might mask critical audio signals.
     - Proper lighting enhances accuracy in tasks like inspections.
5. **Emphasize Worker Control:**
   - Explain that giving workers some control over environmental factors (e.g., adjusting lighting, temperature, or ventilation) can improve comfort and productivity.
6. **Incorporate Social and Cultural Considerations:**
   - Mention that cultural norms, such as dress codes or work hours, can affect how environments are perceived and accepted.
   - Stress the importance of designing inclusive environments that account for these differences.

(Slides 32 & 33)

Objective: Explain the key principles of interface design, focusing on how to make interfaces intuitive, ergonomic, and error-resistant to enhance usability and safety.

1. **Engage the Students:**
    - Start by asking, *"What do you think makes a good interface for equipment or tools?"*
    - Encourage examples from everyday life, such as smartphones, control panels, or car dashboards.
2. **Introduce the meaning and Role of Interfaces**
3. **Discuss the Importance of Psychological and Physical Design Factors:**
    - Emphasize that interface design must address both **psychological factors** (e.g., usability, intuition) and **physical factors** (e.g., ergonomics, accessibility).
    - Mention that this ensures equipment is not only functional but also user-friendly.
4. **Explain the Key Principles of Interface Design (slide 33)**
    - **Clear and Accessible Information:**
        - Interfaces should provide a quick overview of key data while allowing access to detailed information as needed.
        - Example: Emergency stop buttons should be prominently placed and easily accessible.
    - **Compatibility with Human Perception:**
        - Design signals, displays, and controls in ways that align with how humans naturally perceive and process information.
        - Example: Place visual signals in easily noticeable locations and ensure controls are intuitive.
    - **Minimizing Errors:**
        - Use clear labels, logical layouts, and responsive designs to reduce the chance of user error.
    - **Ergonomic Operation:**
        - Ensure controls fit the body part used to operate them, considering factors like strength, accuracy, and speed.
        - Example: Foot pedals should be appropriately sized and positioned for comfort.

- **Logical Layouts:**
  - Arrange controls to reflect natural human behaviour and task requirements.
  - Example: Turning a knob clockwise to increase volume follows common population stereotypes.
- **Avoiding Accidental Operation:**
  - Position critical controls to prevent unintentional activation while maintaining accessibility.

(Slide 34)

Objective: Introduce the terms workspace and workstation and general design principles for them.

Workspace – volume allocated to one or more persons in the work system to complete the work task

Workstation – combination and spatial arrangement of work equipment, surrounded by the work environment under the conditions imposed by the work tasks.

Introduce the purpose of workspace design:

- Explain that workspaces and workstations should be designed to support both **stability** (a secure base for safe physical effort) and **mobility** (freedom to move and adjust posture).
- Emphasize that the design must align with workers' body size, posture, strength, and movement needs.

Introduce key design considerations:

- Discuss the following principles with examples:
  - **Adequate space:**
    - Ensure there is enough room for workers to maintain good postures and perform tasks comfortably.
  - **Posture variation:**
    - Allow opportunities for workers to change posture during tasks to reduce fatigue and muscle strain.
    - Example: Providing sit/stand workstations.
  - **Easy access to tools and equipment:**
    - Design workspaces so tools and equipment are within easy reach to minimize awkward movements or excessive stretching.

(Slides 35-38)

Objective: explain principles that specifically relate to body size and posture

Engage the Students with Real-Life Examples:

- Begin by pointing out that **body size is influenced by clothing and equipment.**
  - Example: People wearing winter clothes take up much more space than those in summer clothes.
  - Example: A person's height can vary based on their footwear, such as boots or high heels.

Discuss Suitable Working Postures:

- Emphasize that **sitting and standing** are the main postures suitable for prolonged work. Other postures, like crouching or kneeling, are not ergonomic for extended tasks.

Introduce the Table as a Decision Aid (Slide 36):

- Explain that the table on the slide helps decide whether sitting, standing, or a combination is the most appropriate posture.
- Describe it as a **selection matrix** that allows decisions by combining two of the nine variables listed.
- If more than two variables are relevant, encourage prioritization:
  - First, decide which two variables are most important for the task.
  - Then, consult the suggestions in the matrix for each variable pair.

Explain the Workspace Envelope Concept (Slide 37):

- Point out that the **workspace envelope** is a three-dimensional area where tasks are performed.
- Stress that most tasks and tools should be positioned within the **normal work area** (the closest and most comfortable range for the worker's reach).
- Discuss the importance of placing frequently used items in the most accessible areas to minimize unnecessary movement or strain.

Discuss Work Surface Height and Elbow Height (Slide 38):

- Highlight that **work surface height should depend on body size, particularly elbow height.**
- Pose a question to students: *"Why should the work surface height be above elbow height for precise tasks and below elbow height for heavy tasks?"*
- After discussion, provide the correct answers:

- **Precision tasks**: The surface should be above elbow height to enhance eye-hand coordination and improve accuracy.
- **Tasks requiring muscular effort**: The surface should be below elbow height to allow workers to utilize the weight of their upper body for added strength.

(Slides 39 & 40)

Objective: Explain the guidelines for acceptable force use, emphasizing the relationship between physical demands, worker capabilities, and muscle endurance.

1. **Engage the students:**
   - Start with a question: *"Why do you think it's important to consider a worker's physical capabilities when designing tasks?"*
   - Encourage students to share examples of tasks that feel too physically demanding or tasks they feel are designed efficiently.
2. **Explain the importance of aligning tasks with worker capabilities:**
   - Highlight that tasks must match workers' strength, posture, and frequency of exertion to avoid unnecessary strain.
   - Stress that poorly designed tasks can lead to muscle, joint, and ligament strain, as well as respiratory or circulatory issues.
3. **Dynamic vs. static work:**
   - Explain the difference:
     - **Dynamic work**: Intermittent force applied for short periods (e.g., lifting and lowering boxes).
     - **Static work**: Continuous force applied for longer periods (e.g., holding a heavy object steady or holding a shopping bag of groceries as in the picture).
4. **Switch to static work and endurance on the next slide :**
   - Introduce the concept of **Maximum Voluntary Contraction (%MVC):**
     - **100%MVC**: Maximum effort can be sustained for only a few seconds before muscles fatigue.
     - **50%MVC**: Endurance lasts about 1 minute before fatigue sets in.
     - **15%MVC**: Muscles can sustain effort for much longer, almost indefinitely, due to reduced strain.
   - Explain that static work endurance depends on oxygen supply to muscles. When muscles contract harder, blood flow is restricted, causing fatigue more quickly.

5. **Discuss guidelines for task design:**
    - **Engage strong muscle groups:** Tasks requiring high strength should involve stronger muscle groups to minimize strain – the higher the muscle strength the lower is the %MVC of the same task.
    - **Use tools or equipment when needed:** For tasks that demand excessive strength, introduce assistive tools or redesign tasks to reduce the load.

(Slide 41)

Objective: Explain the principles of body movements

Bullet Point 1: Balance movements to prevent prolonged immobility.

- Explanation: When tasks require staying in one position for too long (e.g., standing, sitting, or holding a tool), muscles can become fatigued due to static load. Movement allows muscles to relax and recover.
- Example: In an assembly line, workers should be allowed to rotate tasks to avoid staying in the same posture or doing the same repetitive motion for long periods.

Bullet Point 2: Ensure the frequency, speed, and range of motions are within safe limits for the body.

- Explanation: Movements that are too frequent, too fast, or require a wide range of motion can lead to overexertion and strain. Proper task design ensures that movements stay within the body's natural and comfortable limits.
- Example: A cashier's workstation should be designed so they don't have to twist their torso repeatedly to reach items on a conveyor belt. The items should flow smoothly within easy reach.

Bullet Point 3: Avoid requiring excessive strength for precise movements over long periods.

- Explanation: Precision tasks (e.g., writing, assembling small parts) require fine motor control, which can be hindered if too much strength is needed or if the task lasts too long without breaks.
- Example: A jeweler working with delicate pieces should have tools designed to minimize grip strength requirements, such as spring-loaded pliers that reduce hand fatigue.

(Slides 42 & 43)

Objective: Explain the key stages of introducing a new work system and emphasize the importance of adjustments, training, and validation to ensure a safe, efficient, and ergonomic implementation.

Most of the bullet points have enough detail already on the slides, there is no need to read everything on the slide, let the students read the slide while pointing out some of the issues. So start with an overview.

- Begin by explaining that the realization and implementation phases are when the design becomes a physical reality and is integrated into the workplace.
- Highlight that this process doesn't end with installation; adjustments, verification, and validation are critical to achieving long-term success.
- Point out, that the adjustment phase is often overlooked but is critical for optimizing the system
- For documentation explain that while ergonomic design reduces the need for extensive training, any necessary instructions or support must be provided. Highlight that proper training ensures workers can adapt quickly and helps the system reach its full potential.
- Explain that verification could be done by reviewing documentation, inspecting components, and testing functionality.
- Point out that, if validation indicates that the system causes harm or fails to meet ergonomic standards, it must be redesigned. Stress the importance of involving workers in the validation process to gather feedback and insights.

(Slide 44)

Objective: Provide examples of evaluation approaches

1. Health and Well-being:
   a. Medical check-ups or health surveillance.
   b. Physiological measurements.
   c. Surveys or subjective feedback from workers.
   d. Psychological assessments using validated tools.
2. Safety:
   a. Assessing system reliability regarding safety.
   b. Tracking errors, unsafe behaviors, near-misses, and accidents.
   c. Conducting hazard identification and risk assessments.
3. System Performance:
   a. Checking for defective products (qualitative evaluation).
   b. Measuring productivity (quantitative evaluation).
4. Usability: Usability involves assessing how effective, efficient, and satisfying the system is for workers. For a detailed breakdown of these measures, guide students to ISO 9241-11.
5. Cost-Benefit: Semi-quantitative models can assess the financial impact of the new design. For example, improved work conditions may reduce sickness absence, minimize production losses, or lower maintenance costs. Positive outcomes like these can be directly translated into cost savings.

4.2 Analytical & Observational methods

Content Area 2: "Work demands analysis & Ergonomic risk assessment" includes 1) a text document that describes the structure of the methods and describes the methods, 2) analytical methods – seminar slides and 3) observational methods – seminar slides.

The ErgoArt consortium envisions that the text document is used as home reading assignment and the students are trained in the use of the methods in seminars. The students need to be trained in analytical methods and pen & paper type of observational methods. We propose to allocate a 45 min seminar for each of the following methods: task analysis, problem Identification Matrix (PIM), REBA, KIM-ABP, ART Tool, MAC & RAPP, NASA-TLX. A number of seminars focusing on simulation software and direct measurement methods could be included based on availability. A final seminar should conclude the content area with a discussion of the self-assessment questions listed in the beginning of the home reading assignment.

Analytical Methods – Seminar slides

(Slide 4)

Objective: Engage the audience by emphasizing the importance of starting with a deep understanding of the work itself before making any changes or interventions. Explain that the first and most critical step in designing an ergonomic workplace (especially for workers with disabilities) is to understand the meaning, structure, and context of the work being done.

This involves more than just observing the physical tasks; it requires analysing what the work is, how it is performed, why it is done in a certain way, and under what conditions. Without this foundational understanding, any intervention risks being ineffective or even counterproductive. There are analytical tools that help to understand the work demands and in some cases these analytical tools may have extensions that also help to think of potential solutions.

(Slide 5)

Objective: Explain how this topic fits into the broader goal of adapting workplaces to the needs of people with disabilities. Emphasize that the tools, methods, and concepts presented are not standalone solutions, but part of a larger process aimed at creating inclusive, accessible, and sustainable work environments. They serve as essential building blocks for identifying barriers, understanding individual needs, and designing targeted adaptations that support equal participation and long-term employment.

(Slide 6)

Objective: Explain the nature of task analysis.

(Slide 7)

Objective: Explain the notation used in hierarchical task analysis (HTA).

- Explain that there are various methods under the task analysis umbrella, and the seminar is focused on hierarchical task analysis (HTA).
- There is no need to spend a lot of time on it at first. Come back to this slide later when the students are working on their own task analysis. Alternatively, this slide could be a handout for students.
- The main idea is that using symbols instead of text allows saving space when writing down the plans for each level of tasks.

(Slides 8 & 9)

Objective: Explain that there are different representations of HTA.

Slide 8 demonstrates hierarchical lists (easy to write down) and slide 9 demonstrates the same HTA in the format of hierarchical diagram.

(Slides 10)

Objective: Explain that every Hierarchical Task Analysis (HTA) can be further developed and refined depending on the specific goals of the analysis.

Depending on the context, HTA can support various applications such as system design, interface design, development of operating procedures, creation of personnel specifications, workload and staffing analysis, and training design. The level of detail included in the HTA should reflect the purpose for which the analysis is being used.

Slide 10 illustrates this by expanding on Task 5: “Add milk.” Highlight that when a new subtask is introduced into an HTA, it must be accompanied by a plan that describes how the subtask is carried out. The plan functions much like computer code, it dictates the sequence and logic of the subtasks and must include clear exit conditions that indicate when the task is considered complete.

Ask the students if they can interpret the slight change in the Plan 0 (Adding milk is optional).

(Slide 11)

Objective: Explain the seminar task

Emphasize that the task they choose to analyse should be as simple as possible. This is important to ensure that the analysis can be completed and shared with others within the limited time available during the seminar.

Remind students that the only way to improve in task analysis is through practice. Starting with a simple task allows them to focus on the structure and logic of the method without getting overwhelmed by complexity.

Point out that the structure revealed through task analysis will be used later as a framework for applying other methods. These upcoming methods will allow students to examine different aspects of the subtasks—such as physical demands, cognitive load, or environmental constraints—building on the foundation established during the task analysis.

The task should be completed within approximately 30 minutes and the remaining time used for a short group discussion. Students are free to document their analysis either using a computer or by hand on paper, whichever they find more convenient. The goal is to produce a clear and structured task breakdown that can be shared and discussed with others.

(Slide 12)

Here starts the next 45 min seminar. You need to have the BIM templates available either in electronic or paper form.

Objective: Introduce problem identification matrices (PIMs) and explain that PIM can be used to expand on the task analysis.

(Slide 13)

Objective: Explain the structure of BIMs and explain the notations used.

Explain that only the lowest-level tasks or subtasks are evaluated in the analysis. For each type of impairment, students must decide whether completing that specific (sub)task presents a potential problem, a clear problem, a severe problem, or is impossible. The appropriate symbol representing this assessment should be marked at the intersection of the impairment type and the corresponding (sub)task in the matrix.

(Slide 14)

Objective: Explain the seminar task

You have two options for organizing the activity: You can either divide the students into groups and have them use the task developed by the ErgoArt team, or ask them to complete the activity individually using the task analysis they prepared during the previous seminar.

If using the task developed by the ErgoArt team, the following disabilities can be assigned to different groups or individuals to help narrow the focus while learning to apply the BIM (Barrier Identification Matrix): 1) Skeletal dysplasia (dwarfism), 2) Complete blindness, 3) Mobility impairment (wheelchair user), 4) Cerebral palsy (poor coordination, tremors, weak muscles), 5) Hearing loss. This approach ensures that each group or students are not overwhelmed and focuses on the specific challenges related to a particular type of impairment while learning how to identify barriers within the task structure.

Save about 10 to 15 minutes for a group discussion.

Observational Methods – Seminar slides

(Slide 4)

Objective: Engage the audience by emphasizing the importance of identifying and understanding risks present in existing workplaces. While these risks can affect both able-bodied and disabled workers, the prevention of further health deterioration is especially critical for workers with disabilities.

Observational tools, as the name suggests, can only be applied to existing workplaces and tasks—those that can be directly observed in practice.

(Slide 5)

Objective: Explain how this topic fits into the broader goal of adapting workplaces to the needs of people with disabilities. Emphasize that the tools, methods, and concepts presented are not standalone solutions, but part of a larger process aimed at creating inclusive, accessible, and sustainable work environments. They serve as essential building blocks for identifying barriers, understanding individual needs, and designing targeted adaptations that support equal participation and long-term employment.

(Slide 6)

Objective: Explain that observational methods typically focus on either physical aspects of work, such as posture, repetitive movements of the upper limbs, or manual material handling; Or on cognitive aspects, such as mental workload.

Many of these methods are commonly referred to by acronyms and are well-known among ergonomics specialists. While there is a wide range of observational tools available, this course focuses on those that are relatively easy to apply in practice.

NB! If you have access to similar methods in your native language that serve the same purpose, you are encouraged to use those instead of the examples provided in this course. Familiarity with local tools can enhance both the quality and usability of the assessment.

(Slides 7 & 8)

Objective: Explain the notation nature and uses of NASA-TLX

Make connection to the task analysis – NASA-TLX can be used to analyse tasks or subtasks not jobs.

NB! C(6,2) denotes combinations of 6 by 2.

(Slide 9)

Objective: Provide definitions to 6 workload dimensions of NASA-TLX and demonstrate what the pairwise comparison means.

Stress that pairwise comparison of the 6 workload dimensions is the first step of the assessment.

(Slide 10)

Objective: Explain the raw rating system

The raw rating is the second step of the assessment. Each workload dimension is rated using a scale with two verbal anchors at each end. It's important to note that Performance is the exception among the dimensions, as its scale is reversed compared to the others. The selected rating must then be converted to a value between 0 and 100. Keep in mind that each tick mark on the scale represents an interval of 5 points.

(Slide 11)

Objective: Explain the scoring table

The weights are determined during the first step of the assessment—pairwise comparisons. Since there are six workload dimensions, each one is compared against the five others, resulting in a maximum possible weight of 5 per dimension. In total, 15 comparisons are made, so the sum of all weights must equal 15.

Depending on the nature of the task, some dimensions may receive a weight of 0, meaning they were not selected as more important in any of the comparisons. Because multiplying by 0 yields 0, these dimensions will not contribute to the final weighted score. The overall score is calculated by multiplying each raw rating by its corresponding weight, summing the results, and then dividing the total by 15.

(Slide 12)

Objective: Explain the seminar task.

The idea is to introduce NASA-TLX after students have learned the basics of task analysis. Since the task used for task analysis should have been simple and familiar, students should be able to apply the NASA-TLX method to the same task they previously analysed. However, if the task was unusual or not part of everyday experience, NASA-TLX cannot be applied effectively, as the method relies on the ability to observe or recall the task in detail.

NASA-TLX is a quick and efficient tool, so students should be encouraged to apply it to multiple, if not all, of the sub(tasks) they analised. Use the remaining time in the 45-minute seminar for a group discussion where students can reflect on their experience with the method and share their ideas on when and how it might be best applied in real-world settings.

(Slide 13)

Objective: Explain the nature of REBA

Although the "R" in REBA stands for *Rapid*, it's important to explain that applying the method may take some time at first, especially for beginners. The core idea behind REBA is to assess body posture not as a whole, but by evaluating individual body segments separately. Each segment (such as the neck, trunk, or limbs) is assessed using simplified rules based on biomechanics and physiology. These individual assessments are then combined using scoring tables to generate an overall risk score. This structured approach allows for a systematic evaluation of postural risks in a wide range of work tasks.

(Slide 14)

Objective: Explain the key elements of the REBA worksheet

The students should have the worksheet on paper, so that they can follow the instructions.

The most challenging part of the REBA method is using the scoring tables, as they are designed to combine three dimensions of information into a two-dimensional format. Because of this, it's essential to pay close attention to the color-coded links between the score cells and the corresponding tables. These colour cues help guide the user through the scoring process and ensure that the correct values are selected at each step.

(Slide 15)

Objective: Explain the seminar task

The image includes a skeleton overlay to help students more easily estimate the angles of body segments. Guide the group through the REBA worksheet step by step. Start by asking students to identify the angle of each relevant body segment, then have them determine the corresponding score based on the worksheet. After that, check whether any penalty conditions apply for each segment. Be sure to ask for multiple student opinions at each step to encourage discussion and critical thinking.

This will likely take the whole 45 minutes, so have a longer group discussion in the end of the next 45 min seminar.

(Slide 16)

Objective: Explain the nature of KIM-ABP

Explain that the method is developed by the Federal Institute for Occupational Safety and Health – BauA, and it belongs to the Key indicator methods series. The KIM-ABP is intended to be used to a more dynamic nature of tasks where still the main concern is the posture.

As the dynamic nature of the task makes the assessment more complicated the assessment is less detailed than in the case of REBA. Here the focus is on three body areas: 1) back, 2) shoulders & upper-arms, and 3) knees and legs.

(Slide 17)

Objective: Explain the key elements of the KIM-ABP worksheet.

The students should have the worksheet available either on paper or electronically.

(Slides 18 & 19)

Objective: Explain the scoring system and interpretation of KIM-ABP results.

(Slide 20)

Objective: Explain the seminar task

The video includes several tasks, but for this exercise, only the first task should be assessed. Since this is an assembly operation, the task is cyclic in nature. Focus on the cycle that begins at 0:21 and ends at 0:46.

Ideally, students should watch the video on their own computers so they can control the playback speed and pace their assessment. Because the assessment requires careful observation, the video should be watched multiple times, each time focusing on different body parts. Students should estimate the proportion of time each posture type, as listed on the worksheet, is maintained during the selected task cycle.

Have a group discussion comparing REBA and KIM-ABP.

(Slide 21)

Objective: Explain the meaning of manual material handling

The term manual material handling may be unfamiliar to those who speak English as a second language. It refers to tasks involving the lifting, lowering, carrying, pushing, or pulling of objects. It's important to explain that lifting and pushing are fundamentally different types of tasks and require different assessment approaches.

MAC (Manual Handling Assessment Charts) and RAPP (Risk Assessment of Pushing and Pulling) are two tools developed by the UK's Health and Safety Executive (HSE)—a public body responsible for promoting, regulating, and enforcing workplace health, safety, and welfare. These tools are similar in structure and purpose, but each is tailored to a specific type of task.

The seminar will focus primarily on the MAC tool, as it is more widely applicable. However, it is still recommended to briefly demonstrate the RAPP worksheet so students can understand how pushing and pulling tasks are assessed using a similar framework.

(Slide 22)

Objective: Explain the risk factors evaluated with the MAC tool.

(Slide 23)

Objective: Explain the key elements of the MAC tool worksheet.

Optionally the manual may be scrolled through instead using this slide.

(Slide 24)

Objective: Explain the way the assessment results are presented

The key here is that the final score is only for comparing different task and whether an intervention had any effect. The colour codes used highlight what needs to be changed during the intervention.

(Slide 25)

Objective: Explain the seminar task

The task parameters are on the still picture.

(Slide 26)

Objective: Explain the nature of the ART-tool

The ART (Assessment of Repetitive Tasks) tool was developed by the UK's Health and Safety Executive (HSE) and shares many similarities with the MAC and RAPP tools. It is specifically designed to assess tasks that involve repetitive movements and physical effort from the upper limbs. These tasks typically require the use of instruments, small tools, or hand-guided machines, and are often performed in a stationary position—either sitting or standing.

The ART tool is most appropriate when the physical workload is characterized by consistent, repetitive motions and force exertion involving the hands, wrists, arms, or shoulders. This type of work often involves either processing or modifying a workpiece or repeatedly handling small objects over the course of the workday.

Common examples of tasks suited to ART assessment include assembly work (e.g. assembling electrical components), soldering, sewing, sorting, cutting, cashiering, pipetting, microscope work, and other activities that demand fine motor control or involve repetitive upper limb actions.

(Slide 27)

Objective: Explain the risk factors evaluated with the ART tool.

(Slide 28)

Objective: Explain the key elements of the ART tool worksheet.

Optionally the manual may be scrolled through instead using this slide.

(Slide 29)

Objective: Explain the way the assessment results are presented

This can be rather short, as it is very similar to the way MAC tool's results are presented.

(Slide 30)

Objective: Explain the seminar task

The video depicts a simple task done only by one hand to make the analysis easier.

4.3 Disability in the Workplace

Content area 3 "Ergonomics Principles & Work Demands Analysis" consist of Lecture slides and practical task slides and a homework task.

The ErgoArt consortium envisions that this content area provides students with a structured understanding of disability in the workplace and the systems supporting vocational and employment rehabilitation. The text and lecture materials are intended to be used as preparatory reading, while the topics are further addressed through lectures and guided seminars. The students are introduced to key definitions of disability, conceptual models, legal frameworks, and international classification systems, as well as to the vocational and employment rehabilitation process in Slovenia.

The seminars should encourage discussion, comparison of national approaches, and reflection on practical implications for employment and workplace adaptation. Practical examples, case studies, and interactive tasks are used to support the application of theoretical knowledge to real-life employment contexts, with a focus on inclusive labour market participation and sustainable employment for persons with disabilities.

Disability in the Workplace – Seminar slides

1. Key Presentation Contents
A. Understanding Disability Definitions

(Slide 4)

Objective: To introduce students to the diversity of definitions of disability and their implications on rights, policy, and employment across international and European contexts.

Key Teaching Points:

1. **Explain to students** that disability is not universally defined—various institutions (UN, WHO, ILO, EU) have **different frameworks and perspectives**.
2. **Emphasize:**
   The definition of disability **influences eligibility** for services, benefits, and legal protections. For example:
   - The **UN CRPD** promotes a **human rights-based model**.
   - The **WHO** promotes a **functioning-based model**.
   - The **ILO** focuses on **labour rights and inclusion**.
   - The **European Commission** highlights the **lack of standardization** within EU Member States

Highlight how **different definitions lead to different practices** in policy-making, workplace adaptations, and access to employment.

(Slides 5&6)

Defining Disability – Origin and Understandings of the Term 'Handicap'
Definitions and Historical Perspectives on Disability, Defining Disability – Origin and Understandings of the Term 'Handicap'
Objective: To provide students with a historical overview of the evolution of the term *'handicap'* and introduce key conceptual models of disability.

Key Teaching Points:

1. **Explain the origin of the term 'handicap'**
   - Originally used in **gambling and horse racing** since the 16th century.
   - It referred to someone who had an *advantage*, not a lack or impairment.
   - Over time, the meaning **shifted** to indicate **disadvantage** or **impairment**.
2. **Discuss the evolution of terminology:**
   - The term 'handicap' became widespread in describing **disadvantages**—economic, social, or physical.
   - Encourage reflection on how **language shapes perceptions** and can carry **stigmas**.
3. **Introduce the two dominant models of disability:**
   - **The Medical Model:** Views disability as a problem that resides within the individual (something to be treated or fixed).
   - **The Social Model:** Focuses on how societal barriers and attitudes disable people, not the condition itself.

(Slides 7-9)

B. Development of Disability Understanding – The ICIDH Framework
"ICIDH and the Social Understanding of Disability"

Objective: To introduce students to the shift in understanding disability from a purely medical issue to a broader social and environmental issue, as reflected in the ICIDH framework.

Key Teaching Points:

1. **Explain the historical significance of ICIDH (1980, WHO):**
   - This classification emphasized that **disability is not only the result of an impairment** but also a product of the **interaction between the individual and their environment**.
   - The environment can either **reduce or increase** the disabling effects of a person's impairment.
2. **Highlight the evolution from the medical to the social model:**
   - Traditional (medical) models, like the **ICD**, focus on **diagnoses and impairments**.
   - The ICIDH introduces a **social perspective**, showing how **societal expectations, norms, and environments** can **create or amplify disability**.
3. **Key message to emphasize:**
   - **Disability is not inherent in the person**—it is a **contextual outcome**, shaped by how inclusive or exclusive the environment is.
4. **Bridge to current thinking:**
   - This shift laid the foundation for later models like the **ICF (International Classification of Functioning)** and for the **UN CRPD (2006)**.

Suggested Student Discussion Prompt:
"How might a person with a physical impairment experience different levels of disability in a city with full wheelchair access versus one with no accessibility infrastructure?"

(Slides 10&11)

C. The International Classification of Functioning, Disability and Health (ICF)
Slide: "ICF and the Broader Understanding of Disability"

Objective: To explain to students how the ICF framework represents a holistic model of disability by combining medical and social perspectives, and how it influenced international policy, particularly the UNCRPD (2006).

Key Teaching Points:

1. **Introduce the ICF (WHO, 2001):**
   - Its purpose is to create a **comprehensive and open classification system** of human functioning.
   - Focuses on **three main aspects** of functioning:
     - **Body functions** (physical and mental functions).
     - **Activities** (what a person can do in daily life).
     - **Participation** (involvement in social and community life).
2. **Highlight the integrated approach:**
   - The ICF links the **medical dimension** (health conditions, impairments) with the **social context** (environment, society).
   - Disability is therefore seen as an **interaction between health conditions and contextual factors**.

3. **Explain its policy relevance:**
   - The **UN Convention on the Rights of Persons with Disabilities (UNCRPD, 2006)** adopted this broader approach.
   - Disability is not only about limitations in the body but also about **barriers created by society** that prevent full participation.
4. **Key message to emphasize:**
   - The ICF shifts the focus from "what is wrong with the person" to "what barriers exist in society and how can participation be enabled."Slide 10

(Slides 12&13)

D. Standards and Regulations Related to Ergonomics and Accessibility

Objective: To familiarize students with international and European standards, directives, and strategies that guide accessibility, universal design, and ergonomics in workplaces and digital environments.

Key Teaching Points:

1. **Introduce the overarching ergonomics standard:**
   - **ISO 26800:2011** – General approach, principles, and concepts of ergonomics.
   - This is the "umbrella" standard that connects with specialized accessibility standards.
2. **Highlight relevant related standards:**
   - **EVS-EN ISO 9241-171:2008** – Guidance on software accessibility (ensures digital systems are usable by all).
   - **EVS-EN 17161:2019** – Design for All approach (universal design as a guiding principle).
   - **ISO/IEC Guide 71:2014** – How to integrate accessibility into standards.
   - **ISO/TR 22411** – Ergonomics data supporting accessibility standards.
   - **ISO 9999:2016** – Classification of assistive products for persons with disabilities.
3. **Introduce the European legal framework:**
   - **European Accessibility Act (Directive (EU) 2019/882):**
     - Sets EU-wide requirements for accessible products and services.
   - **Web Accessibility Directive (Directive (EU) 2016/2102):**
     - Ensures accessibility of websites and mobile apps of public sector bodies.
   - **EU Strategy for the Rights of Persons with Disabilities 2021–2030:**
     - A long-term policy framework for promoting rights, accessibility, and inclusion.
4. **Key message to emphasize:**
   - Accessibility and ergonomics are not just technical requirements, but **legal and ethical obligations** to ensure equal participation of persons with disabilities in society and the workplace.

(Slides 14-19)

E. Legal Framework in Slovenia Supporting Equal Opportunities for Persons with Disabilities
National Legal Framework for Employment and Rehabilitation

Objective: To categorize and explain the most important Slovenian laws that ensure equality, protect rights, and promote employment opportunities for persons with disabilities.

Key Teaching Points (Organized by Category):

1. **Employment & Rehabilitation**
   - **Employment Relationships Act (ZDR-1):** General employment rights, anti-discrimination provisions.
   - **Pension and Disability Insurance Act (ZPIZ-2):** Vocational rehabilitation, workplace adaptation, training, education, compensation.
   - **Equalization of Opportunities for Persons with Disabilities Act (ZIMI):** Focused on accessibility and equal treatment.
2. **Health & Safety**
   - **Occupational Health and Safety Act (ZVZD-1):** Ensures safe working conditions for all, including persons with disabilities.
   - **Health Care and Health Insurance Act (ZZVZZ):** Guarantees access to healthcare and insurance coverage.
3. **Equality & Non-Discrimination**
   - **Equal Opportunities for Women and Men Act (ZEMŽM):** Protects against gender-based discrimination, also applied in disability-related cases.
   - **Personal Data Protection Act:** Safeguards sensitive information, such as disability status.
4. **Public Sector & Cultural Field**
   - **Public Employees Act:** Sets conditions of employment and rights in the public sector.
   - **Act on the Realization of the Public Interest in Culture:** Regulates cultural employment (indirectly relevant for inclusion).
   - **Societies Act:** May affect employment within cultural associations.

Key Message to Emphasize:

The Slovenian legal framework provides **comprehensive protection and support**, but it is a **dynamic system**, constantly evolving to ensure full equality in the workplace for persons with disabilities.

(Slides 20&21 Poland)

Legal Framework & Key Institutions
Key Legislation:

1. **Constitution of the Republic of Poland (1997)**
   - Supreme law of Poland.
   - **Article 32:** All persons are equal before the law, have the right to equal treatment by public authorities, and shall not be discriminated against in political, social, or economic life.
   - Foundation for all anti-discrimination and equal opportunity measures.
2. **Labour Code (Kodeks Pracy) of 26 June 1974**
   - Regulates employment relationships, rights, and obligations of employers and employees.
   - Key provisions include non-discrimination and equal treatment in employment.
   - Articles 183a–183e specifically address equal treatment and prohibition of discrimination on various grounds, including disability.
3. **Act on Vocational and Social Rehabilitation and Employment of Persons with Disabilities (27 August 1997)**
   - Focuses on the integration of persons with disabilities into the workforce.
   - Regulates employment, rehabilitation, and benefits.
   - Provides mechanisms of support for both employers and employees.
4. **Act on the Implementation of Certain EU Regulations Regarding Equal Treatment (3 December 2010)**
   - Ensures compliance with EU directives on equal treatment and non-discrimination, including in employment.
   - Covers various discrimination grounds, including disability.
   - Sets out legal measures for protection against discrimination.
5. **European Union Law – Employment Equality Directive (2000/78/EC)**
   - EU directive to combat discrimination in the workplace, including disability.
   - Poland, as an EU member, is obliged to implement this directive into national law.

Key Provisions for Persons with Disabilities

- **Equal Treatment in Employment:** Articles 183a–183e of the Labour Code ensure that employees with disabilities are treated equally.
- **Non-Discrimination:** Prohibits discrimination in recruitment, promotion, training, and workplace conditions.
- **Support Mechanisms:** Includes vocational rehabilitation, workplace adaptations, and benefits for both employers and employees to facilitate inclusion.
- **Compliance with EU Law:** National legislation aligns with EU directives to ensure consistent standards for disability inclusion and anti-discrimination.

Professor Guidance:

- Compare Poland's approach to Slovenia's framework.
- Highlight the role of EU directives in shaping national disability policies.
- Encourage discussion on implementation challenges and practical impacts in the workplace.

Key Takeaways for Students

- Poland's legal framework integrates **constitutional, national, and EU law** to support employment of persons with disabilities.
- Labour Code and the Act on Vocational and Social Rehabilitation provide **practical mechanisms** for inclusion.
- EU directives reinforce national law and ensure alignment with broader European standards.
- Professors can use case studies to illustrate **real-world application and enforcement** of these laws.

Professor Guidance:

- Discuss the interplay between constitutional principles, national legislation, and EU directives.
- Stimulate critical thinking: How effective are these legal measures in practice? How could policies evolve?

(Slides 22&23 Estonia)

Employment of Persons with Disabilities in Estonia

1. Legal Framework & Key Institutions

Constitution of the Republic of Estonia

- Upholds equality before the law and prohibits discrimination.
- Serves as the constitutional foundation for all disability and anti-discrimination legislation.

Key Legislation:

1. **Equal Treatment Act**
   - Prevents discrimination on various grounds, including disability.
   - Employers must take appropriate measures to enable persons with disabilities to access, participate in, or advance in employment, or undergo training, unless such measures impose a disproportionate burden.
2. **Occupational Health and Safety Act**
   - Work, equipment, and workplaces must be adapted to the physical and mental abilities of employees with disabilities.
   - Adaptation includes making buildings, workrooms, workplaces, or equipment accessible and usable.
3. **Social Benefits for Disabled Persons Act**
   - Supports independent living, social integration, equal opportunities, education, and employment.
   - Provides partial compensation for additional expenses caused by disability.

4. **Social Welfare Act**
    - Regulates technical aids for prevention or mitigation of functional impairments.
    - Supports maintenance or improvement of physical and social independence, operational capacity, and work ability.
5. **Requirements for the Construction of Buildings Considering Special Needs of Disabled Persons (Regulation)**
    - Ensures buildings are accessible and usable for persons with disabilities.
    - Lays down technical standards for inclusive architecture and workplace environments.

Professor Guidance:

- Emphasize the holistic approach in Estonia: legal, social, and architectural measures.
- Discuss the interaction of constitutional principles with sector-specific legislation.
- Encourage comparison with Slovenia and Poland regarding employer obligations and social support mechanisms.

Key Provisions for Persons with Disabilities

- **Employment Inclusion:** Equal Treatment Act and Occupational Health and Safety Act require accessible workplaces and reasonable accommodations.
- **Social Support:** Social Benefits and Social Welfare Acts provide financial and technical support to facilitate independent living and workforce participation.
- **Accessible Infrastructure:** Building regulations ensure accessibility in both public and private buildings.

Professor Guidance:

- Highlight the multi-layered approach: legal protection, workplace adaptation, social benefits, and accessible infrastructure.
- Use real-life examples or case studies of Estonian companies integrating employees with disabilities.

Key Takeaways for Students

- Estonia combines **constitutional rights, labor protections, social benefits, and accessibility regulations** to promote inclusion.
- Employers have a **duty to accommodate** unless disproportionate, emphasizing practical inclusion.
- Social policies complement employment law by supporting independent living and equal opportunities.
- Accessible infrastructure is legally mandated, underlining the importance of universal design in workplace inclusion.

Professor Guidance:

- Encourage discussion on the effectiveness of combining legal, social, and technical measures.
- Compare Estonia’s approach with Poland and Slovenia, analyzing strengths and potential challenges.

(Slides 24&25 Statistic)

Employment Statistics & Barriers for Persons with Disabilities. Employment Statistics in Partner Countries (2022)

Professor Guidance:

- Highlight that employment rates for persons with disabilities are **consistently lower** across countries.
- Encourage students to analyze **systemic and structural factors** that contribute to these disparities.

Low Inclusion in Culture and Arts

- Persons with disabilities show **low participation rates in cultural and artistic sectors.**
- Key barriers include:
    1. **Limited workplace adaptations** – insufficient accessibility measures in studios, theaters, galleries, and cultural venues.
    2. **Stigmatization & social prejudice** – negative societal attitudes reduce opportunities.
    3. **Physical barriers** – architectural or transportation limitations.
    4. **Financial constraints** – higher costs of accommodations or participation.
    5. **Awareness & information gaps** – lack of knowledge about opportunities and rights.
    6. **Social isolation** – limited networking or professional integration.

Professor Guidance:

- Discuss intersectionality: how disability interacts with sector-specific challenges (e.g., arts and culture).
- Encourage students to propose solutions addressing **both structural and social barriers.**
- Prompt critical thinking: How can legislation, social programs, and workplace adaptations **effectively increase inclusion.**
- Discuss practical examples of **accessible arts initiatives or inclusive** employment projects in Europe.

(Slides 26&27 Poland economic issues)

Employer Support Programs in Poland

1. Overview

Employers in Poland who hire persons with disabilities can access a variety of **financial and organizational support programs**. These programs aim to reduce employment barriers, incentivize inclusive hiring, and provide practical workplace accommodations.

Professor Guidance:

- Emphasize the **multi-level support system** combining subsidies, tax relief, and workplace adaptation.
- Discuss how such measures can **motivate employers** to hire persons with disabilities.

2. Key Support Programs

2.1 Subsidies for Salary Costs

- Employers may receive monthly subsidies based on the employee's degree of disability:
  - **Moderate disability:** up to PLN 1,500 per month
  - **Severe disability:** up to PLN 2,250 per month
- Typically granted for regular employment contracts and calculated to encourage long-term employment.

Professor Guidance:

- Highlight the **graduated support system** reflecting disability severity.
- Encourage discussion of potential impacts on employment rates.

2.2 Workplace Adaptation Grants

- One-time grants to adapt workplaces or purchase necessary equipment.
- Can cover up to **80% of adaptation costs**, with maximum amounts typically **PLN 15,000–20,000**, depending on project scope.
- Examples: ergonomic equipment, accessible facilities, assistive technologies.

Professor Guidance:

- Illustrate practical examples of workplace adaptations in different industries.
- Discuss cost-benefit perspectives for employers.

2.3 Social Security Contribution Relief

- Employers may receive reductions in social security contributions for employees with disabilities.
- Relief can cover a significant portion or even the total amount of contributions, depending on disability level and contract type.

Professor Guidance:

- Discuss how this **reduces financial barriers** to hiring.

- Highlight differences between employment types (full-time, part-time, contract).

2.4 Tax Benefits

- Employers may deduct expenses related to:
  - Workplace adaptations
  - Training programs for employees with disabilities
- Specific amounts depend on costs incurred and applicable tax regulations.

Professor Guidance:

- Explain the interaction of **tax incentives with direct subsidies**.
- Encourage students to explore **real-life examples of tax planning for inclusive hiring**.

2.5 Training and Education Support

- Financial support for training employees with disabilities:
  - Up to PLN 300 per month for vocational courses
  - Higher amounts for specialized or advanced training
- Aims to enhance **skills and employability** of persons with disabilities.

Professor Guidance:

- Highlight role of training in **career development and job retention**.
- Compare with Estonian and Slovenian approaches to skills development.

2.6 Support for Creating Sheltered Workplaces

- Financial assistance for establishing **sheltered workplaces** (protected employment environments):
  - Initial funding varies by project scope
  - Some grants exceed PLN 100,000 for comprehensive adaptations
- Provides ongoing operational support for organizations employing persons with disabilities.

Professor Guidance:

- Discuss the **sheltered workplace model** as a bridge to mainstream employment.
- Encourage reflection on **advantages and limitations** of sheltered employment.

3. Key Takeaways for Students

- Poland offers **comprehensive employer support** combining salary subsidies, workplace adaptations, tax relief, and training incentives.
- Support is **tiered and flexible**, reflecting the employee's disability and employment context.
- These programs aim to **increase workforce inclusion** and reduce barriers in both mainstream and sheltered employment.

Professor Guidance:

- Encourage students to **compare national approaches** (Poland vs. Slovenia vs. Estonia).

Discuss policy effectiveness: Which measures are most impactful? Where could improvements be made?

(Slides 28-31)

Economic issues Legal Framework & Key Institutions Slovenia

Key Legislation:

- **ZZRZI** – Act on Vocational Rehabilitation & Employment of Persons with Disabilities
- Regulates rights to vocational rehabilitation, network of service providers, employment quotas, and financial incentives.
- **ZIMI** – Act on Equalization of Opportunities for Persons with Disabilities
- Guarantees equal opportunities and prohibits discrimination.
- **ZPIZ-2** – Pension & Disability Insurance Act
- Vocational rehabilitation is recognized as a right arising from disability insurance.

1. Key Institutions:

- **JŠRIPS (Public Scholarship, Development, Disability and Maintenance Fund)** – implements financial incentives, including wage subsidies, workplace adjustments, and support services.
- **Employment Service of Slovenia (ESS/ZRSZ)** – grants disability status to unemployed individuals and manages vocational rehabilitation procedures.
- **Pension & Disability Insurance Institute (ZPIZ)** – plans and finances vocational rehabilitation programs for insured persons with disabilities.

Professor Guidance:

- Highlight interconnections between legislation and institutional roles.
- Discuss comparative frameworks in other EU countries to contextualize Slovenia's approach.

2. Financial Incentives (JŠRIPS)

1. **Wage Subsidy for Persons with Disabilities**
   - Based on minimum wage; amount varies depending on employment type and performance.

- Eligibility extends to self-employed disabled persons meeting specific conditions.

2. **Wage Subsidy for Persons with Disabilities**
   - Based on minimum wage; amount varies depending on employment type and performance.
   - Eligibility extends to self-employed disabled persons meeting specific conditions.
3. **Support Services (Supported Employment)**
   - Employers with an approved support plan can claim reimbursement for service costs.
   - Encourages integration into the workplace with professional suppor
4. **Workplace Adaptation and Equipment**
   - Fund co-finances reasonable adaptations based on individualized plans.
   - Covers actual and eligible costs, promoting accessible work environments.
5. **Social Security Contribution Exemption**
   - Disability companies employing a required proportion of disabled persons are exempt from contributions (Article 74 ZZRZI).
6. **Bonuses and Additional Incentives**
   - Rewards for exceeding employment quotas and other targeted achievements.

Professor Guidance:

- Provide examples of companies benefiting from these incentives.
- Facilitate discussion on economic and social impacts of financial support.

3. Employment Quotas

Obligation:

- Applies to employers with ≥ 20 employees; quota varies by sector (government regulation).

Non-Compliance:

- Monthly contribution = 70% of minimum wage per missing disabled employee.

Alternative Compliance:

- Employers can meet quotas through contracts with disability companies or employment centers instead of direct employment.

Micro and Small Employers (<20 employees):

- Not obliged to meet quotas but may still access all financial incentives if conditions are met.

Professor Guidance:

- Use case studies to illustrate quota implementation and alternative compliance mechanisms.
- Encourage critical evaluation: benefits, challenges, and ethical considerations.

4. Key Takeaways for Students

- Slovenia integrates **legal, financial, and institutional measures** to support the employment of persons with disabilities.
- Incentives include **wage subsidies, workplace support, adaptations, and tax relief**, facilitating inclusion.
- Quotas ensure a baseline level of employment while allowing **flexible implementation**.
- Even smaller employers can participate in the system under eligibility conditions.

Professor Guidance:

- Stimulate discussion: How effective are these measures in practice?
- Encourage students to compare with policies in other jurisdictions and consider potential improvements.

System of Vocational and Employment Rehabilitation and Employment of Persons with Health Issues in Slovenia – Lecture slides

1. Purpose of the Presentation

The aim of this presentation is to provide an overview of the system of vocational and employment rehabilitation, key legislative frameworks, international classifications, and practical examples related to employing individuals with health issues in Slovenia.

2. Key Presentation Contents

A. Vocational and Employment Rehabilitation

(Slide 32)

Objective: Inclusion of persons with disabilities in the labour market.

1. **Explain** to students the importance of disability status for entering the Labour market
2. **Emphasize**: The key point that every person seeking inclusion in the labour market requires **"disability status"** to access appropriate support and benefits.

(Slide 33)

1. Use this slide to distinguish between vocational rehabilitation (ZPIZ-2) and employment rehabilitation (ZZRZI).

Objective: Vocational Rehabilitation (ZPIZ-2)

1. **Explain the definition**: Vocational rehabilitation focuses on enabling individuals with health issues to reintegrate into the workforce with necessary adjustments.
2. **Legal Basis**: Pension and Disability Insurance Act (ZPIZ-2).
3. **Key Objective**: Assist individuals in adapting to job demands by providing appropriate rehabilitation programs.
4. **Additional Example:** A factory worker with chronic back pain is provided ergonomic adjustments to their workstation and a gradual return-to-work plan after participating in a vocational rehabilitation program.

Objective: Employment Rehabilitation (ZZRZI) is a complementary part of the rehabilitation system.

1. **Explain Legal Basis**: Vocational Rehabilitation and Employment of Persons with Disabilities Act (ZZRZI).
2. **Focus**: Providing professional support and guidance for individuals reentering the labor market or starting new employment. Discuss specific steps and programs under ZZRZI, highlighting the guidance and counselling available for individuals.
3. **Key Focus**: How employment rehabilitation aligns with labour market needs and individual capabilities.
4. **Exercise for Students:**
   - Scenario: Split students into pairs. One student role-plays as a rehabilitation counselor and the other as an individual seeking employment rehabilitation. They must discuss challenges and jointly develop a realistic employment plan.

B. Use of International Classifications

(Slides 34-36)

Objective: International Classification of Functioning, Disability, and Health (ICF)

1. **Definition**: ICF provides a standardized framework for evaluating the functional capabilities of individuals and identifying necessary adjustments for employment. Explain how the **International Classification of Functioning, Disability, and Health (ICF)** allows a comprehensive evaluation of an individual's functional capabilities.
2. Practical use in rehabilitation centers like Soča, where teams assess both medical and social factors affecting employability.

3. **Additional Example:**
   - A person with mobility limitations is assessed using ICF. The team identifies their ability to perform desk work with minor modifications, such as installing a height-adjustable desk and providing access to an elevator.
4. **Group Exercise:**
   - Divide students into groups. Each group is assigned a case (e.g., an individual with hearing impairment, chronic illness, or mobility issues). They use the ICF model to identify functional barriers and propose specific job accommodations.

(Slides 37&38)

Objective: International Classification of Diseases (ICD **)**
Use of ICD in Disability Assessments

1. **Purpose**: ICD provides a global system for classifying diseases and health conditions, crucial for diagnosing and coding health impairments.
2. **Highlight** the importance of ICD in categorizing health conditions and their impact on work.
3. **Stress**: How disability commissions rely on ICD for coding impairments and recommending work adjustments.
4. **Important Note**: ICD-10 serves as a foundation for standardizing decisions in disability assessments and determining work adjustments.
5. **Additional Exercise:**
   - **Case Analysis**: Provide students with mock medical reports containing ICD codes. Students interpret the codes and recommend job roles or modifications based on the health conditions described.
   - **Example:** For an individual with 30% impairment due to optic nerve damage, ICD helps define restrictions, such as:
     1. Avoiding tasks requiring fine vision or depth perception.
     2. Working in well-lit environments with reduced physical strain.

(Slides 39&40)

Objective: The Process of Determining Disability
This slide explains the step-by-step process of determining disability status in Slovenia, including the role of key stakeholders and the timeline for decision-making.

1. **Initiating the Process**
   - Explain that the process starts with an official initiative.
   - **Who can submit the initiative?**
     - A doctor of work medicine in collaboration with a personal physician.
     - The insured person or their representative.
     - A selected personal physician.
   - **Ask the audience:** *Who do you think should have the most influence in initiating the process, and why?*

2. **Disability Committee Evaluation**
    - The ZPIZ disability committee is responsible for reviewing cases.
    - They assess medical documentation and the impact of health issues on employability.
    - **Example:** A person with a chronic illness may be assessed to determine if they can continue working with modifications.
    - **Activity:** Have students discuss a hypothetical case and decide if a person should be classified as disabled.
3. **Decision Timeline**
    - The deadline for issuing a decision is **four months** from the application.
    - Explain that this ensures a structured and fair process.
    - **Ask students:** *Do you think four months is an appropriate timeframe? Why or why not?*
4. **Final Decision and Disability Insurance Rights**
    - The committee makes a **yes/no decision** on disability status.
    - If approved, a proposal for asserting disability insurance rights is sent to ZPIZ.
    - **Real-life implication:** The decision affects access to financial support, rehabilitation, and employment opportunities.

Interactive Discussion:

- What challenges could arise in the disability determination process?
- How can medical professionals and employers better support individuals undergoing this process?

Conclusion:

- Emphasize that the disability determination process is crucial in ensuring fair access to employment and social protection.
- Encourage students to consider how they might apply this knowledge in professional settings.

(Slide 41)

Slide Title: A Disabled Person
Objective: This slide aims to define a disabled person within the framework of **ZZRZI (Employment Rehabilitation and Disability Insurance Act in Slovenia)** and highlight the challenges they face in employment.

Key Teaching Points:

1. **Definition of a Disabled Person (According to ZZRZI)**
    - Explain that a **disabled person** is someone who has been formally assessed and determined to have **physical or mental impairments or illnesses** that affect their ability to work.
    - Mention that this **legal definition** ensures they are eligible for specific **support, rights, and rehabilitation programs**.
    - **Ask students:** *Why is it important to have a formal definition of disability in employment laws?*

2. **Employment Barriers for Disabled Individuals**
   - Disabled individuals **face challenges** in the job market, such as:
     - **Gaining employment** (many employers hesitate to hire disabled workers).
     - **Retaining employment** (they may need workplace adjustments).
     - **Career advancement** (limited opportunities for promotions or training).
   - Discuss **workplace discrimination** and **stereotypes** that may prevent disabled individuals from advancing in their careers.
   - **Interactive Activity:** Ask students to list **ways in which workplaces can be more inclusive** for disabled employees.
3. **Real-World Examples & Discussion**
   - Present a **case study** of a person with a disability facing workplace challenges and discuss solutions.
   - Explore **success stories** of disabled individuals who thrived in their careers despite challenges.

Interactive Discussion & Activities:

- **Group Discussion:** *What can employers do to create equal opportunities for disabled employees?*
- **Debate:** *Should companies be required to hire a certain percentage of disabled workers? Why or why not?*
- **Role-Playing Exercise:** Have students **simulate a job interview** where an employer must consider hiring a disabled applicant.

Conclusion:

- A disabled person, as legally defined, faces **barriers to employment**, but with proper **support, rehabilitation, and inclusive policies**, they can successfully integrate into the workforce.
- Encourage students to **advocate for inclusivity** in their future workplaces.

(Slide 42)

Vocational Rehabilitation (ZPIZ-2) in Slovenia

1. Overview

Vocational rehabilitation in Slovenia is regulated under **ZPIZ-2** (Pension and Disability Insurance Act). The system ensures that persons with disabilities are **assessed and supported** to continue or return to work according to their functional abilities.

Professor Guidance:

- Emphasize the **structured and formal process** linking disability assessment with workplace adaptation.
- Discuss the **role of multiple stakeholders**: disability commission, employer, personal physician, and ZPIZ.

2. Disability Assessment and Classification

- A **Disability Commission** evaluates individuals to determine:
  - **Invalid status**
  - **Disability category**:
    - **Category 1:** Severe disability
    - **Category 2:** Moderate disability
    - **Category 3:** Mild disability
- The decision triggers a coordinated response for vocational rehabilitation.

Professor Guidance:

- Highlight that the **disability category determines the type and intensity of support**.
- Encourage discussion on **how categories influence workplace accommodations**.

3. Communication and Coordination

- Once the disability is confirmed, **ZPIZ informs**:
  - The **employer** (through official notification)
  - The **ZZZS** (Health Insurance Institute of Slovenia)
  - The **personal physician**
- Coordination ensures all parties understand the employee's needs and available support.

Professor Guidance:

- Stress the importance of **timely communication** between institutions for effective rehabilitation.
- Discuss the **legal obligations of employers** when notified.

4. Vocational Rehabilitation Measures

Based on the disability assessment and recommendations:

1. **Shorter Work Hours**
   - Adjusted work schedules to fit the employee's capacity.
2. **Workplace Adjustments**
   - Modifications to equipment, tools, or environment to enable safe and effective work.
3. **Alternative Workplace Placement**
   - Transfer to a more suitable role within the organization, if necessary.
4. **Formal Vocational Rehabilitation**
   - Programs to **develop skills, adapt to new roles, or re-enter the workforce**.
   - May include training, therapy, or other supportive services.

Professor Guidance:

- Use case examples to illustrate each type of intervention.
- Highlight the **flexibility and individualization** of measures.

5. Key Takeaways for Students

- Slovenia has a **well-structured vocational rehabilitation system** linking disability assessment with employment support.
- Effective rehabilitation requires **collaboration between multiple stakeholders**.
- Measures are **individualized** according to disability severity and work capacity.
- Understanding the ZPIZ-2 framework is critical for **inclusive HR policies and workplace management**.

Professor Guidance:

- Prompt discussion: How does Slovenia's approach compare to Poland and Estonia?
- Encourage reflection on **how policy, legal obligations, and workplace practices intersect** in supporting employees with disabilities.

(Slides 43 -46)

Title: An Example of Employment Rehabilitation in Slovenia
Objective: This slide explains the employment rehabilitation process for disabled individuals in Slovenia, highlighting the role of **Soca** as a provider and the final assessment of employability.

Key Teaching Points:

1. **Referral for Rehabilitation**
   - A **disabled person** is referred for employment rehabilitation.
   - Discuss **why employment rehabilitation is important** (e.g., helps individuals reintegrate into the workforce, gain independence, and maintain a productive role in society).
   - **Ask students:** *What do you think are the biggest challenges for disabled individuals in the workplace?*
2. **Role of Soca in Employment Rehabilitation**
   - **Soca** is a provider of employment rehabilitation services.
   - It evaluates and **gives an opinion** on the person's ability to work.
   - Explain the different types of support Soca might provide, such as **workplace adaptations, vocational training, and career counseling**.
   - **Case Study Discussion:** Present an example of a person who lost mobility and discuss how employment rehabilitation could help them return to work.
3. **Final Assessment and Determination**
   - The assessment includes a **final opinion** on:
     - **Employability**: Can the person work?
     - **Work suitability**: Can they perform **simple tasks** or **structured tasks**?
   - **Explain the difference:**
     - *Simple tasks* → Repetitive work, fewer cognitive demands (e.g., packaging, sorting).

        - *Structured tasks* → More complex work, possibly requiring specialized training.
    - **Ask students:** *What types of workplace adjustments could help individuals with disabilities succeed in structured jobs?*

Interactive Discussion and Activities:

- Discuss **real-life barriers** to employment for people with disabilities.
- Ask students to brainstorm **inclusive workplace strategies** for disabled individuals.
- Debate: *Should employers be required to hire a certain percentage of disabled workers? Why or why not?*

Conclusion:

- The employment rehabilitation process ensures that disabled individuals receive the necessary **support, training, and assessment** to reintegrate into the workforce.
- Encourages **inclusive employment policies** and **equal opportunities**.

6. Discussion Questions for Participants

- Start by asking: How do you currently use ICF or ICD in your organization to support individuals with disabilities?
- What are the biggest challenges in hiring or retaining individuals with health impairments?
- What workplace adjustments have you found to be the most effective in your experience?
- Encourage students to share their thoughts and examples.

7. Conclusion

1. Summarize the importance of vocational and employment rehabilitation in creating an inclusive labor market.
2. **Final Key Point**: The system is designed not just to ensure social protection, but to actively enable individuals with disabilities to contribute to society through meaningful employment.

4.4 Inclusive & Universal Design

Content Area 4: "Inclusive & Universal Design" includes 1) lecture slides, 2) a text document that expands on the lecture content, and 3) a homework task.

The ErgoArt consortium envisions that this content area introduces students to the principles of inclusive and universal design as a foundation for creating accessible, usable, and equitable environments for a diverse range of users. The lecture slides and accompanying tasks are intended to be used as preparatory reading and as a basis for

guided seminars, where students are encouraged to actively engage with design challenges related to human diversity, ability, and disability.

Students are introduced to key concepts of universal and inclusive design, international standards and legal frameworks, ergonomic principles, and the role of assistive technologies, with a strong emphasis on real-world application. Through visual examples, case studies, discussions, and practical assignments, students learn to critically evaluate products, environments, and systems, and to propose inclusive design solutions that support participation, dignity, and independence for all users.

Inclusive & Universal Design – Seminar slides

(Slide 5)

Objective: Introduce the idea of human ability as a multidimensional and continuous spectrum, and explore how assistive technologies can enhance specific dimensions of ability rather than simply "compensate for disability".

Content explanation: Presented picture helps us rethink the way we understand human ability. Rather than defining people by binary categories—'able' or 'disabled'—we can view ability as something that exists across multiple axes or dimensions: mobility, vision, cognition, communication, and many others. For some tasks, only a minimum level of one specific ability might be required. Other tasks may depend on a combination—perhaps moderate mobility and hearing, or high dexterity and memory. It varies. Importantly, assistive technologies don't simply replace what's "missing." Instead, they can enhance existing abilities within particular dimensions. For example, a text-to-speech tool supports reading; a prosthetic limb enhances mobility; noise-canceling headphones may aid concentration. Yet, our traditional way of defining disability tends to draw hard lines—often based on thresholds or diagnostic criteria. What this image reminds us is that we're actually dealing with a continuum. Everyone's abilities fluctuate throughout life, in different contexts, and even across the course of a single day.

Engage the Students:

- Ask: "When you think of 'ability' or 'disability,' do you imagine it as a yes-or-no condition—or something more dynamic?"
- Follow-up: "Can someone be fully capable in one area but need support in another? Can that change over time or depending on context?"

(Slide 6)

Objective: Introduce the social definition of disability as a result of interaction between long-term impairments and environmental barriers, and discuss its implications for inclusion, accessibility, and assistive solutions.

Content Explanation: This definition shifts the focus away from the individual's condition alone and highlights the role of the environment in creating or removing barriers. Disability is not simply the result of an impairment—it emerges when physical, social, or systemic obstacles limit participation on equal terms.

For instance, someone with a mobility limitation may experience disability only when buildings lack elevators or accessible pathways. A person with a hearing impairment may face no significant barrier in a quiet one-on-one conversation, but may be excluded during a fast-paced, audio-only meeting.

This definition, rooted in human rights and reflected in documents like the UN Convention on the Rights of Persons with Disabilities (CRPD), encourages us to look critically at the design of our environments, systems, and attitudes. It aligns with the concept of assistive technology or envirements as an enabler, not just a compensator.

Understanding disability as a dynamic interaction—rather than a fixed status—opens the door to more flexible, inclusive, and equitable solutions.

Engage the Students:

- Ask: "According to this definition, where does disability come from—the person, or the environment?"
- Follow-up: "Can you think of a situation where a space or system 'created' disability that didn't need to exist?" (e.g., stairs with no ramp, instructions only in written form, no option to adjust lighting or sound)
- Group prompt: "In small groups, identify a common environment (e.g., classroom, workplace, website) and name one barrier it might create—and one way to remove or reduce that barrier."

(Slide 7)

Objective: Illustrate the diversity of human needs and demonstrate how inclusive and assistive solutions can benefit a much broader group than just people with permanent disabilities.

Content Explanation: This image serves as a visual reminder that accessibility is not only for people with diagnosed or long-term impairments. While we clearly see individuals using wheelchairs, white canes, or prosthetics, we also see a mother with a stroller—someone who may temporarily face many of the same environmental barriers (e.g., stairs, narrow pathways, uneven terrain).

This challenges the assumption that assistive technology or inclusive design is "only" for a small minority. In reality, everyone benefits from environments that are flexible, well-designed, and barrier-free—whether due to age, injury, fatigue, temporary condition, or context (e.g., carrying heavy bags, pushing a cart, or recovering from surgery).

By recognizing this spectrum of needs and experiences, we can move beyond a deficit-based model of disability and instead promote design and policy choices that serve a wider population—not just out of compliance, but because it simply makes sense.

Engage the Students:

- Ask: "Looking at this image, who do you think benefits from accessible design?" (Let students go beyond the obvious answers.)
- Ask: "Have you ever found yourself in a situation where a design intended for accessibility made your life easier—even if you don't identify as a person with a disability?"
- Follow-up: "What does this tell us about the relationship between design, context, and ability?"
- Optional: "Think of a recent time when you struggled with a task in public space—what would have made it easier or more inclusive?"

(Slide 8)

Objective:Present the legal and ethical foundation for accessibility and universal design, emphasizing the right of persons with disabilities to participate in all areas of life *on an equal basis with others*.

Content Explanation: This excerpt from Article 9 of the UN Convention on the Rights of Persons with Disabilities (CRPD) outlines the duty of governments to ensure equal access for people with disabilities to all areas of life. This includes the physical environment, transportation, information and communication, digital technologies, and public services, in both urban and rural settings.

The key phrase here is: "on an equal basis with others." This does not mean 'separate accommodations'—it means inclusive environments that allow equal participation, independence, and dignity.

This article provides a strong foundation for universal design, which aims to build accessibility in from the start, rather than adding it as an afterthought. It also reminds us that accessibility is not only about buildings—it spans digital, architectural, educational, training, and transport systems.

Engage the Students:

- Ask: "Why do you think the phrase 'on an equal basis with others' is emphasized here? What does it imply?"
- Follow-up: "Can you think of examples where people with disabilities are technically 'included' but not truly able to participate equally?"
- Ask: "Which of these domains—digital, architectural, transport, education, or training—do you think is most overlooked when it comes to accessibility?" Why?"
- Optional discussion: "How might universal design approaches reduce the need for individual accommodations?"

(Slide 9)

Objective: Highlight the limitations of designing for an “average” human and illustrate the importance of inclusive design that reflects real human diversity.

Content Explanation: This image is a powerful visual critique of traditional design approaches based on the so-called "average" person—often symbolized by the Vitruvian Man. Historically, many products, systems, and environments have been designed using data or assumptions that represent only a narrow segment of the population—usually young, healthy, able-bodied adult males.

But real human diversity includes differences in age, gender, height, ability, body shape, mobility, sensory perception, and cultural context. In this image, we see people of all types: a wheelchair user, a small child, elderly adults, a tall athlete, a business professional, and a mother. One person is literally trying to squeeze into the Vitruvian mold—underscoring how poorly that model fits the population it is supposed to serve.

Inclusive design shifts the focus from the “average user” to the range of users—embracing variability and designing for flexibility, adaptability, and equity.

Engage the Students:

- Ask: "Who do you think the Vitruvian Man represents? Who is left out of that representation?"
- Follow-up: "Can you think of a product or environment that feels like it was designed for someone very different from you?"
- Ask: "What risks do we face when we design only for the average user? Who benefits—and who is excluded?"
- Optional group task: "In pairs or small groups, identify a commonly used object (e.g. door handle, office chair, ATM) and discuss how it might be redesigned to better reflect human diversity."

(Slide 10)

Objective: Define universal design and explain its purpose as an inclusive approach that ensures environments are accessible, understandable, and usable by the widest range of people—regardless of age, height, or disability.

Content Explanation: This definition from the Irish Disability Act (2005) highlights the essence of universal design: to create and organize environments in ways that work for *everyone*. The focus is not only on accessibility, but also on making things understandable and usable—which is essential for full participation in everyday life.

Importantly, this definition explicitly recognizes diversity in age, physical characteristics (like height), and disability. It reminds us that design is not just about functionality, but also about dignity, independence, and equality of experience.

Universal design benefits all users by removing unnecessary complexity, offering flexibility, and anticipating a wide range of needs from the beginning—rather than retrofitting solutions later. It's proactive, not reactive.

Engage the Students:

- Ask: "What stands out to you in this definition? Is there anything surprising about what is included or emphasized?"
- Follow-up: "What's the difference between something being accessible and something being understandable?"
- Ask: "Can you name an example of a product or environment that is easy to use regardless of someone's age, size, or ability?"
- Group reflection: "Think of a time when a design made you feel excluded or frustrated. What could have made that experience more universally usable?"

(Slide 11)

Objective: Present and compare key international approaches to inclusive and universal design, highlighting their different origins, priorities, and drivers.

Content Explanation: This diagram, based on research by Clarkson and Coleman (2013), shows how different design philosophies—though sharing common goals—have emerged in different cultural, political, and sectoral contexts.

On the horizontal axis, we see a continuum from a focus on age (left) to a focus on disability (right). On the vertical axis, we move from public/legislation-driven approaches (bottom) to market-driven/private sector approaches (top).

- Design for Ageing (UK/EU) focuses on the needs of older adults, often guided by demographic trends and social policy.
- Inclusive Design (UK) emerged from the design and business sectors and emphasizes user diversity and market opportunity.
- Universal Design (Japan/USA) reflects different emphases: in the USA, it is more strongly linked with disability rights and legal compliance; in Japan, it leans toward holistic, cross-generational usability.
- Design for All (Nordic countries, EU) is a more policy-driven, socially inclusive model that aims to embed accessibility across all aspects of public life.

Understanding this variety helps us see that universal design is not a fixed formula, but a dynamic concept influenced by social values, policy frameworks, and stakeholder roles.

Engage the Students:

- Ask: "What differences do you notice between these approaches? Which seem more driven by social policy—and which by business?"

- Follow-up: "Do you think focusing on age leads to different outcomes than focusing on disability? How might the design solutions differ?"
- Ask: "Where would you place your own country or organization on this chart? What drives inclusive design in your context?"
- Optional activity: "Split into small groups. Each group selects one approach from the chart and discusses its strengths, limitations, and how it might apply in your field of work or study."

(Slide 12)

Objective: Clarify the relationship between universal design and related design concepts, and explain how they differ in scope, intention, and inclusivity.

Content Explanation: This slide shows that universal design is often surrounded by a constellation of related approaches:

- *Inclusive Design*
- *Design for All*
- *User Needs Design*
- *User-/Human-Centred Design*
- *Barrier-Free Design*
- *Accessible Design*
- *Adaptable Design*
- *Transgenerational Design*
- *Design for a Broader Average*

While these terms are sometimes used interchangeably, they each reflect slightly different priorities or strategies—some focus on removing barriers (like barrier-free or accessible design), others on personalization (like adaptable design), and still others on involving users directly in the process (user-centred design).

The diagram on the right helps visualize how these concepts relate.

- Universal design aims to proactively include the widest possible range of users *without the need for special adaptation*.
- Accessible design often involves adding features to improve access *for specific user groups*.
- Adaptable design refers to systems or products that can be *customized or adjusted* to fit individual needs.

Together, they contribute to the broader goal of designing environments and tools that respect human diversity.

Engage the Students:

- Ask: "Have you come across these terms before? Do you see them used interchangeably in your field?"

- Follow-up: "Looking at the diagram—what are the practical differences between accessible, adaptable, and universal design?"
- Ask: "Why do you think universal design is represented as the largest and most comprehensive category here?"
- Small group task: "Pick two of the terms listed and discuss how their approaches might differ in practice. Where might they be most useful?"

(Slide 13)

Objective: Clarify the overlapping terminology within the field of universal and inclusive design and warn against overly simplified or poorly implemented interpretations that may unintentionally exclude users.

Content Explanation: This slide brings attention to two important discussions in the field of universal design:

1. Terminology overlap: Terms like *Universal Design*, *Inclusive Design*, and *Design for All* are often used interchangeably, and in many contexts, they refer to similar principles—namely, designing environments, products, and systems that are accessible and usable by the widest possible range of users.
2. Emerging sub-domains: While some distinctions between concepts like *Design for All*, *Barrier-Free Design*, *Accessible Design*, and *Transgenerational Design* may appear minor, new hybrid approaches are emerging. For example, *User Sensitive Inclusive Design* reflects a more nuanced, adaptive, and participatory approach.
3. Critical insight: Importantly, the final point is a cautionary note—a poorly conceived idea of universal design can do more harm than good. If the principle of "designing for all" becomes rigid or generic, it can actually result in designs that fail to meet the needs of many users. This happens when designers assume "one size fits all" rather than genuinely engaging with diversity and context.

Engage the Students:

- Ask: "Have you come across these terms—Universal Design, Inclusive Design, Design for All—in your own field? Were they used consistently or interchangeably?"
- Follow-up: "Why do you think there are so many terms for seemingly similar ideas? Is that helpful or confusing?"
- Ask: "What might be an example of a 'badly conceived' universal design? Can a design that tries to serve everyone end up serving no one well?"
- Discussion prompt: "In your own area of expertise, how could universal design be implemented in a way that's too narrow, and what would be a better alternative?"

(SlideS 14-15)

Objective: Introduce the Seven Principles of Universal Design and demonstrate how each principle addresses real-world user needs and enhances usability for a wide range of people.

Content Explanation: This slide uses visual metaphors to illustrate the seven foundational principles of Universal Design, developed by the Center for Universal Design at North Carolina State University. Each principle corresponds to a common design challenge and shows how thoughtful, inclusive design can make environments more usable for everyone.

1. Tolerance for Error – Designs should minimize hazards and the adverse consequences of accidental or unintended actions. (E.g., placing obstacles like fire hydrants in visible, predictable locations.)
2. Perceptible Information – Information should be communicated effectively, regardless of sensory abilities. (E.g., text must be readable and clear for all users, including those with low vision.)
3. Low Physical Effort – Products should be usable efficiently and comfortably with minimal fatigue. (E.g., doors, chairs, or machines that don't require excessive force.)
4. Equitable Use – The design should be useful to people with diverse abilities. (E.g., ramps and elevators for users who cannot navigate stairs.)
5. Simple and Intuitive Use – The design should be easy to understand, regardless of the user's experience or literacy level. (E.g., floor buttons in elevators that are logically organized.)
6. Size and Space for Approach and Use – Appropriate size and space should be provided for reach, manipulation, and mobility. (E.g., placing shelves or switches within reach for all users.)
7. Flexibility in Use – The design should accommodate a wide range of preferences and abilities. (E.g., desks or tools that can be used by both left- and right-handed individuals.)

These principles don't just benefit people with disabilities—they improve usability, comfort, and access for all.

Engage the Students:

- Ask: "Which of these seven principles do you think is most often overlooked in everyday environments?" Why?
- Follow-up: "Can you give an example of a product or place that demonstrates one of these principles well?"
- Activity: "Split into groups. Assign each group one of the seven principles. Have them describe how it could be applied in a classroom, office, or public space."
- Reflection: "Which of these principles would you prioritize if you had to redesign your current workplace or school?"

(Slides 16-17)

Objective: Explain the principle of *Equitable Use* in universal design and emphasize its importance in ensuring that environments, products, and services are usable by people with diverse abilities—without stigmatization or separation.

Content Explanation: This slide illustrates the principle of Equitable Use, which states that designs should be useful and marketable to people with diverse abilities—on equal terms, not as special or separate solutions.

We see several examples:

- A playground element (seesaw) that can be used equally by a child standing and a child using a wheelchair.
- A man in a wheelchair using a public outdoor machine, like a ticket dispenser or pump.
- People helping carry a wheelchair user down stairs—showing a lack of equitable access (the design relies on others to compensate for its shortcomings).
- A conceptual image of a stairlift mechanism, highlighting attempts to retrofit accessibility.
- A bottom row showing how design affects users of different ages and strengths in lifting or carrying.

Equitable design doesn't mean identical experience—but it means comparable ease, dignity, and autonomy. It avoids singling people out or requiring extra effort to participate in everyday activities.

Engage the Students:

- Ask: "What's the difference between providing access and ensuring equitable use?"
- Follow-up: "Which of the images here do you think best reflects equitable design? Which ones reveal a lack of it?"
- Ask: "Have you ever been in a situation where a design unintentionally excluded or singled someone out?"
- Activity: "In small groups, pick a space (e.g., school, park, shop, hospital) and discuss how it could be redesigned to better support equitable use."

(Slides 18-19)

Objective: Illustrate and analyze labor force participation trends among people with disabilities, emphasizing how age and ability status influence employment involvement.

Engage the Students: Prompt students to consider the reasons for declining participation rates with age and disability status. Ask them to discuss how assistive technologies or workplace accommodations could change these trends. Use breakout discussions or quick reflective writing prompts to explore how public policy, workplace culture, or technological solutions might close the gap in participation rates.

Objective: Encourage students to analyze real-world design solutions through the lens of fair and inclusive use by evaluating how specific functional limitations might lead to exclusion—and how alternative, inclusive strategies can be integrated.

Content Explanation: This two-part task invites students to adopt a user-centered perspective when assessing a product, service, or system, using classifications from the ICF framework (International Classification of Functioning, Disability and Health) and principles of inclusive design.

Students are given a list of functional areas (e.g., vision, hearing, taste, speech, motor reflexes, immune response, etc.) categorized by ICF codes (e.g., b210, b230, etc.). These serve as a basis to consider which user groups might be excluded from using a given solution.

On slaid 19th, students are shown a simplified diagram of the ICF model, highlighting the relationships between:

- Health condition
- Body functions & structures
- Activity limitations
- Participation restrictions
- Environmental and personal factors

This broader context helps participants understand how limitations in functioning are not just about the individual but are shaped by design choices and environmental context.

Task Instructions (Homework)

1. Choose a real-world solution (e.g., an interface, device, tool, service, space).
2. Describe how it works and who it primarily serves.
3. Identify which group(s) of users may be excluded due to specific limitations.
4. Propose alternatives or modifications that would improve inclusion.
5. Evaluate whether the alternatives:
    - Operate in the same “channel” (e.g., visual, auditory, tactile)
    - Are non-stigmatizing
    - Are equally safe
    - Are equally attractive or acceptable
6. Finally, suggest how to integrate these alternatives into the overall solution—ideally in a seamless and inclusive way.

Engage the Students:

- Ask: "Can one design work equally well for users with very different needs? What trade-offs are acceptable?"
- Encourage: "Think about technologies or environments you’ve used recently. Who might have trouble using them, and why?"
- Optional variation: Assign different ICF domains (e.g., b210 Vision, b730 Muscle power) to small groups to compare how different body functions intersect with design.

(Slides 20-21)

Objective: Explain the principle of *Flexibility in Use* as a core element of universal design, emphasizing the importance of accommodating a variety of user preferences, abilities, and contexts—without stigma or unnecessary complexity.

Content Explanation: Flexibility in use refers to designing products and environments that allow for multiple methods of interaction, adapt to different user preferences (e.g., right-/left-handedness, speed, simplicity), and support accuracy and comfort. The images contrast a DIY solution (tape-covered remote tailored to individual needs) with a stigmatizing oversized remote, showing that effective inclusive design is not only functional but also respectful and non-patronizing. Good design enables personalization without making users feel different or excluded.

Engage the Students:

- Ask: *"Which example better reflects true flexibility in design—and why?"*
- Discuss: *"Can a well-meant design still be exclusionary or stigmatizing?"*
- Prompt: *"Think of a product you've used that allowed you to personalize or simplify the experience. How did it affect your comfort or confidence?"*
- Activity: *"Redesign a common object to be more flexible in use—for diverse users—without sacrificing dignity or visual appeal."*

(Slide 22)

Objective: Explore how the principle of *flexibility in use* applies to specific body functions (as defined in ICF) and evaluate the extent to which design should adapt to user needs—rather than requiring users to adapt to the design.

Content Explanation: This task connects universal design with real functional diversity. Using ICF body function codes (e.g., b210 – vision, b730 – muscle power), students analyze how well a selected object or service supports flexibility. The accompanying diagram (ICF model) helps students understand that limitations in activity or participation often result not just from impairments, but from environmental factors—like rigid or non-inclusive design.

Task Instructions (Homework):

1. Choose one everyday object, system, or service (e.g., public transport ticket machine, coffee machine, mobile app, desk, etc.).
2. Pick one ICF function (e.g., b230 – Hearing functions, b740 – Muscle endurance functions).
3. Describe how a person with limitations in this area would interact with the chosen solution.
4. Reflect:
    - *Does the product offer flexibility in use?*
    - *Would the person have to adapt to the solution, or does the solution adapt to them?*
    - *To what extent?*

5. Suggest specific improvements to increase flexibility in use for that group, while keeping the design attractive and usable for all.

(Slides 23-26)

Objective: Explain the importance of inclusive design principles—specifically flexibility, simplicity, readability, and clear information—in creating products and environments that meet diverse user needs.

Content Explanation: Design should reduce complexity, accommodate various sensory and cognitive abilities, and remain intuitive. Flexibility in use allows the same object to serve users with different needs or preferences. Simplicity focuses on intuitive operation and information hierarchy. Readability ensures that necessary information is perceivable by users regardless of limitations. Clear information leverages multiple modes of communication and emphasizes accessibility through contrast and compatibility with assistive technologies.

Engage the Students:

- Ask: "Can you recall a product that was difficult to use for someone in your family? Why was it difficult?"
- Show images from the slides and ask: "Who might benefit from this solution?" "What function or ability is being supported or limited?"
- Group activity: Match ICF body function codes (e.g., b210 – vision) with real-world product examples—what works and what doesn't?
- Discussion: "Should products adapt to people, or should people adapt to products? Why?"
- Encourage students to evaluate whether selected products support inclusive use or impose barriers, and propose specific redesigns.

(Slide 27)

Objective: Explore how the principles of simplicity and readability in design can support users with diverse sensory and cognitive functions.

Content Explanation: Simplicity reduces unnecessary complexity and supports intuitive use. Readability ensures that essential information is communicated effectively, regardless of the user's capabilities. Both principles are essential when designing for individuals with varying vision, hearing, speech, or motor functions. Matching the form of communication to the user's needs increases usability, comprehension, and participation.

Task Instructions (Homework):
Task 3 and 4

1. Choose a solution to analyze – ideally an existing information-based document (e.g., poster, leaflet, application form).

2. Analyze: How to simplify it for people with specific limitations (e.g., visual impairment, low literacy, limited motor skills)?
3. Refer to the listed ICF body functions (e.g., b210, b230) and suggest concrete improvements for clarity and accessibility.

(Slides 28-29)

Objective: Explain the principle of *Tolerance for Error* as a key aspect of inclusive and universal design. Show how minimizing the effects of user mistakes protects users and enhances usability.

Content Explanation: Use real-world examples (e.g. inaccessible waterfront without barriers or safety lines, spill-proof kitchen tools) to illustrate the need for design solutions that prevent or mitigate the consequences of human errors. Emphasize how design can protect users in vulnerable situations (e.g. people with visual impairments).

Engage the Students:
Prompt students to analyze everyday products or environments. Ask:

- What errors might a user make here?
- What would the consequences be?
- How could design prevent or soften those consequences?
  Encourage personal reflection or group brainstorming to identify high-risk tasks or places that lack error tolerance.

(Slides 30-35)

Objective: Explain the concept of "tolerance for user error" and apply FMEA (Failure Mode and Effects Analysis) as a method to assess and mitigate risks associated with human errors in the context of assistive solutions or accessibility elements.

Instruction:

Students are invited to:

1. Choose a real-life solution or system (e.g., wheelchair access, information guide, interface).
2. Analyze it under the lens of "tolerance for error" – focusing on situations where human error might occur.

Students will conduct a simplified FMEA analysis, which includes:

- Identifying a potential error or limitation (e.g., not finding the door, wrong object selected).
- Describing its effect on user safety, access or experience.
- Determining the cause (e.g., poor visibility, lack of signage).
- Identifying the method of detection or control currently in place.
- Evaluating:
  - P – Probability of error occurrence.

    - S – Severity of consequences.
    - W – Likelihood of error detection.
- Calculating PR (Risk Priority Number) = $P \times S \times W$.
- Proposing recommended remedies or improvements to increase safety or usability.

Task 5: Tolerance Analysis through FMEA

- Students refer to body functions from the ICF classification (e.g., vision, hearing, motor reflex).
- They evaluate how a system may fail in supporting these functions due to design-related shortcomings.
- Using FMEA tables provided (Probability, Effect, Detection), they complete a risk matrix for selected use cases (e.g., access to platform, opening doors, device misrecognition).

(Slides 36-44)

Objective: Introduce principle of "Comfortable to use", focusing on how design can reduce unnecessary physical effort, support neutral postures, and enhance accessibility for users with diverse physical abilities.
Content Explanation: This part of the lesson presents ergonomic principles related to comfortable and effortless use, illustrating how good design can reduce strain, support a wide range of users, and improve usability.
Slide 36: Shows examples of adapted kitchen environments and tools (e.g., utensils, scissors) that minimize effort and improve grip — demonstrating how design supports ease of use and independence.
Slide 37: Lists key ergonomic guidelines such as neutral posture, minimal force, and reduced repetitive or prolonged actions — essential for preventing discomfort and injury.
Slide 38: Presents a plug with an ergonomic handle — a simple example of assistive design that requires less force and awkward movement.
Slide 39: Illustrates how physical access and reach must be adapted to diverse users' sizes and abilities — reinforcing inclusive spatial planning.
Slide 40: Describes specific dimensioning rules: visibility, reachability, hand variation, and space for assistive devices.
Slide 43: Introduces the percentile principle — showing that design should accommodate 90% of users (5th–95th percentile) for broad usability.
Slide 44: Real-life example from a public restroom and an exercise prompt — invites students to critically analyze a non-inclusive design and propose improvements.

Engage the Students:

Ask students:

- "What everyday objects do you find physically uncomfortable to use?"
- "How could they be improved using ergonomic design?"
- "Have you ever used a space that felt clearly designed for ease of use — or the opposite?"

(Slide 45)

Content Explanation: Slide 45 presents Task 6: *Design a customer counter* that is accessible and comfortable for a wide range of users.

Students are instructed to:

1. Define features – What should the counter allow users to do? (e.g., write, sign, pay, speak comfortably).
2. Select users – Consider diversity: adults, children, wheelchair users, elderly, etc.
3. Find data – Use anthropometric data (e.g., arm reach, seated height, eye level) to guide design decisions.

The illustrations show ergonomic silhouettes in standing, seated, child, and wheelchair-user postures, each with detailed body measurements. This visual emphasizes the necessity of adapting dimensions to accommodate different body types and physical abilities.

The task aims to reinforce how ergonomics and inclusive design go hand in hand by challenging students to think critically, gather relevant data, and apply theory to a practical problem.

(Slide 46)

Objective: Illustrate the importance of genuine Universal Design by highlighting design flaws that superficially meet requirements but fail in practice.

Content Explanation: Slide 46 displays an example of poorly executed universal design — a stairway with integrated ramps that are far too steep and unsafe for wheelchair users. While the intention may have been to provide accessibility, the execution creates a dangerous and unusable structure.

This visual critique helps students understand:

- The difference between *formal* and *functional* accessibility.
- That universal design must consider practical usability, not just visual compliance.
- The need to validate designs through user testing and ergonomic reasoning.

Engage the Students:

Ask:

- “Would you feel safe using this ramp in a wheelchair?”
- “What principles of Universal Design are violated here?”
- “How would you redesign this solution to make it truly inclusive?”

Encourage students to share examples of similar design failures they've seen and discuss how to improve them.

(Slides 46-50)

Objective: Introduce the concept of anthropometric fit in universal design and engage students in applying ergonomic principles to a practical task.

Content Explanation: This slide presents Task 6, which requires students to design a customer counter by considering anthropometric data of different user types (e.g., a person in a wheelchair, a child, a seated adult, and a standing adult). The steps are:

1. Define key features of the counter (e.g., height, accessibility, workspace).
2. Select users to be included (e.g., persons with disabilities, various age groups).
3. Find and apply anthropometric data (e.g., reach distance, seated height).

The silhouettes illustrate how body dimensions differ across user groups and emphasize the need for inclusive, data-driven design.

Engage the Students:
Ask students:

- What physical characteristics should be considered to ensure this counter is usable for all?
- What challenges might arise when trying to accommodate a wide range of users?
- Can one solution fit all, or should we allow for adaptability?

(Slides 51-56)

Objective: Present a comprehensive set of principles that guide inclusive and age-sensitive design to enhance safety, independence, participation, dignity, and overall usability for diverse users, especially older adults and people with disabilities.

Content Explanation: These slides outline 14 design principles proposed by MB that supplement Universal Design by addressing ergonomic, psychological, and social aspects of user experience:

1. Optimal Compensation – Design should compensate for reduced physical and mental capabilities due to aging, but without overcompensation that may cause harm.
2. Safety – Ensure the user's and environment’s safety throughout the product’s life cycle, considering misuse.
3. Tolerance and Resilience for Errors – Limit the consequences of user errors, including design resistance to misuse, imbalance, or coordination problems common in aging.
4. Independence – Maximize users' ability to live and act independently without external help.
5. Participation – Enable social and family participation; avoid isolation caused by poor design.

6. Encouraging Social Activity – Foster the creation of social ties and participation through supportive environments.
7. Dignity – Respect the dignity of all users and avoid solutions that unintentionally violate it.
8. Image Improvement – Use design to improve public perception of elderly and disabled individuals.
9. Self-realization and Development – Enable opportunities for mental and physical growth, respecting diversity in aging populations.
10. Universal Design – Adapt systems to the widest possible user group; alternative solutions must avoid stigmatization.
11. Efficiency – Ensure high efficiency with minimal physical effort, matched to functional requirements.
12. Simplicity and Clarity – Avoid unnecessary complexity and ensure intuitive operation.
13. Legibility of Information – Make sure information is easy to perceive and process, even with sensory limitations.
14. Universal Aesthetics – Respect cultural and timeless aesthetics while fulfilling a specific purpose.

Engage the Students:

- Ask students to select two principles they consider most critical in designing for elderly users and explain why.
- Invite discussion on how these principles may apply to technology products or public spaces.
- Ask: Can you identify an environment or product that exemplifies or violates several of these principles?

(Slide 57)

Objective: Encourage students to apply knowledge of the 7 Principles of Universal Design (7PU) to real-world urban design flaws, using visual examples.

Content Explanation: This slide presents two problematic public space examples:

- Left image: Broken and uneven paving leading to water accumulation and potential tripping hazards.
- Right image: A deteriorated bus stop area with poor maintenance, lack of accessibility, and possibly unsanitary or unsafe conditions (e.g. presence of a dead animal).

Students are prompted to analyze these images in terms of which of the 7 Principles of Universal Design are violated:

1. Equitable Use – Environments are not usable by all, especially people with mobility issues.
2. Flexibility in Use – Lack of adaptable or accommodating design for various users.
3. Simple and Intuitive Use – Navigating the area is unclear and not intuitive.

4. Perceptible Information – Poor visual communication and signage in degraded areas.
5. Tolerance for Error – High risk of injury due to uneven surfaces and environmental neglect.
6. Low Physical Effort – Navigating damaged infrastructure requires increased physical effort.
7. Size and Space for Approach and Use – No adequate space or surface for wheelchair access or safe walking.

Engage the Students:

- Ask students: *Which principles are clearly violated in each photo?*
- Invite discussion: *How could these areas be redesigned to meet 7PU standards?*
- Optional group activity: Redesign the bus stop or walkway in sketch or concept form based on 7PU.

(Slide 58)

Objective: Introduce students to the four core attributes of human-centered ergonomic quality as defined in the ISO/CD 25065:2017(E) standard.

Content Explanation: This diagram presents a quadrant model highlighting key ergonomic quality components necessary for human-centered systems:

- Accessibility: The system or product must be reachable and usable by people with diverse abilities and conditions.
- Usability: Focuses on the efficiency, effectiveness, and satisfaction with which users can achieve their goals.
- User Experience: Emphasizes how users feel when interacting with a product – including emotions, preferences, and perceived value.
- Avoidance of Harm: Ensures the system does not cause physical, cognitive, or emotional harm.

Together, these dimensions create a holistic view of what it means to design ergonomically for all users.

Engage the Students:

- Ask: *How do these four elements interact in product design?*
- Prompt: *Can you name a product or system that fails in one of these areas? What could be improved?*
- Optional group discussion: *Assign each group one of the four areas to illustrate with an example.*

(Slides 59-60)

Objective: Introduce the concept of reasonable accommodation (MRU) as a complementary approach when universal design is not feasible.

Content Explanation: This slide presents the legal and ethical foundation of *rational improvements* (also called *reasonable accommodation*), defined in the Convention on the Rights of Persons with Disabilities. MRU refers to necessary and appropriate modifications made on a case-by-case basis to ensure people with disabilities can exercise all rights and freedoms equally. Such accommodations must not impose disproportionate or undue burden.

The slide emphasizes that while universal design is the goal, there are situations when individual adaptations are necessary.

Engage the Students:
Ask:

- Can you think of real-life situations where universal design was not possible, but rational improvements helped?
- What could be examples of a "disproportionate or undue burden"?
- How might this principle apply in school, the workplace, or public transport?

(Slide 61)

Objective: Discuss assistive technologies and confront them with ICF (International Classification of Functioning, Disability and Health) and discuss real-world examples of supportive tools.

Instruction for Students / Participants:

1. Match function codes with technologies:
   Read through the body functions (e.g., b210 - Vision functions) and match each with the appropriate technologies listed on the right-hand side of the slide. Explain the link in your own words.
2. Add more examples:
   For each functional category (vision, hearing, motor, etc.), name:
   - One example of a real device you know or have seen.
   - One innovation (existing or conceptual) that could improve support in that area.
3. Classify by purpose:
   Label whether each example is primarily:
   - Assistive (supports existing function)
   - Compensatory (replaces a lost function)
   - Preventive (reduces risk of deterioration)

Engaging Questions for Discussion:

- What makes a technology "assistive" vs. "compensatory"?
- Which of these technologies could also improve the lives of people without diagnosed disabilities?
- Which areas (e.g. olfactory or immune functions) are underrepresented in technological development, and why?

(Slide 62)

Objective: Summarize key insights from the session on inclusive and universal design to reinforce student understanding and stimulate reflection.

Content Explanation (Slide Summary):

- Inclusive Design: Making products/services usable by as many people as possible.
- Universal Design: A broader approach benefiting all, not just those with disabilities.
- Early design for diversity is better than late fixes.
- Accessibility ≠ Inclusion: Accessibility is a part, but inclusion is the goal.
- Inclusive tech/environments improve usability, comfort, and independence.
- Universal Design principles: Flexibility, simplicity, tolerance for error.
- Organizations benefit from inclusive design (market, compliance, impact).
- Inclusive environments support dignity, autonomy, empowerment.

Engage the Students: Ask students:

- Which of these takeaways feels most relevant to your field of study or work?
- Can you think of a product or environment that meets these principles well?
- What is the difference between accessibility and inclusion in real-life scenarios?

4.5 Work Aids and Assistive technology

Content Area 4b: "WORK AIDS AND ASSISTIVE TECHNOLOGY" includes 1) lecture slides, 2) a text document that expands on the lecture content, and 3) a homework task.

The ErgoArt consortium envisions that this content area enables students to apply principles of inclusive and universal design to real-life workplace situations through the analysis of concrete cases and the use of assistive technologies. The homework task and lecture materials are designed to encourage problem-oriented thinking, where students identify different types of barriers faced by individuals with disabilities and health impairments and propose appropriate, user-centered solutions.

Students are guided to analyze user needs, work tasks, and environmental constraints, and to design feasible solutions based on ergonomic principles, accessibility requirements, and assistive technologies. Through case-based learning, discussion, and

practical assignments, the content supports the development of critical thinking, empathy, and practical design skills, while emphasizing the role of assistive technologies in promoting independence, participation, and inclusive employment.

Homework Task

Real cases:

Table: Case ID Type of barrier encountered: physical (P), technological (T), communication (C), organisational (O), legislative or political (L), negative attitude (A)

Case description (a few sentences). Additional information, e.g. case reported by an employee or employer, source of information, stage of employment, etc.

Case identifier	Type of barrier	Case description (problem, attitude, situation, etc.)	Diagnosis
S1	P	An inclusive and supportive work environment is half the battle. I have worked as a security guard, driver, for private individuals, in a manufacturing company, and other various companies, but I have never been satisfied anywhere. Relationships and impersonal work routines have always been a problem.	Physical limitations, disability due to shoulder pain
S2	T	My biggest problem is with my knees, which are always painful. I can walk, ride a bike from time to time, and my right arm has some limitations. Good teamwork, taking personal limitations into account - help with lifting heavy objects is important.	knee pain
S3	A + C	Good understanding of the work environment in relation to the employee's difficulties. I had difficulty interacting with colleagues, particularly in terms of various social skills. I also experienced sensory issues such as intense light, noise and discomfort with touch. I am bothered when there are too many people around me. Minimising social contact, wearing headphones at work due to noise and using sunglasses if there is too much light.	Minimises social contact, wears headphones at work – noise is distracting, too much light.
S4	P	Ignorance and disregard for employees' problems. The most difficult situations were when I felt pain or numbness and told my employer that I could no longer work as much, but he did not understand my problem. The problem is not	spinal problems, limitations in lifting heavy loads,

		visible; for example, I had no strength in my hands (carpal tunnel syndrome), but my employer required me to work. I had to switch hands while working. At that time, my health deteriorated, with high blood pressure and mental disorders, because I could not cope with the workload.	carpal tunnel syndrome
S5	P+T+C	Communication barrier. Hearing loss, employer adapted the workplace by purchasing a better hearing aid.	Deaf since 7 months of age
S6	P +A	Supportive work environment. I had physical limitations and problems with my spine. The employer did not make any changes to the workplace. I need help from colleagues to lift heavier objects.	physical limitations, spinal problems
S7	P + A	An adapted work environment allows me to work smoothly. I have 3% vision, which means that I do not drive, cannot read without magnification, have difficulty recognising people, navigating unfamiliar spaces and need help with precise tasks such as personal hygiene, e.g. nails, eyebrows and painting. I cope well in my familiar environment, knowing where things are kept, and my household chores are almost routine. My workplace is adapted. I have a computer with a larger monitor, speech synthesis, technical aids for blind and visually impaired people, a magnifying glass and a screen reader. Since 2019, in accordance with the Personal Assistance Act, I have been receiving personal assistance for 40 hours a week. This means that my assistant helps me with my professional duties, transport, personal needs, accompanies me to work in the field and with household chores.	blindness, 3% vision, sensory impairment , Stargardt's disease
S8	A	In a team where most people have limitations, some employees perform their tasks while others avoid work. So, similar problems arise as in other teams. Considering that we are a company that employs people with disabilities and that three-quarters of the employees in my	98% loss of vision in the right eye

		department are disabled, 95% of the jobs are appropriately adapted. However, it still depends on the individual. We come here for a specific purpose (i.e. to work) to achieve something, but there are people who spend eight hours here just to kill time. "I can't do it, I'm disabled..." - that's something I'd like to eliminate. You step back and do the work yourself, even if it's not your responsibility, just to make sure that the goal is achieved before 2 p.m. It happens everywhere: as a manager, you either protect them, push them, or end up doing it yourself.	
S9	C+A	A well-organised working environment without constant disruptions and changes in the surroundings. When I was transferred, I just wanted to be moved from a very hot environment – namely the kitchen – to a quiet one, so now I am happy.	After a heart attack
S10	P+ C	Communication barrier, need for a supportive employer and provision of hearing aid. There are no problems with colleagues I have been working with for a long time. The problem is new colleagues, until they accept my communication difficulties. However, when a new employee joins, it is a little difficult for me because of communication.	Deaf, no physical limitations.

Task:

Using the design process outlined in the lecture, propose a solution to Users problems. Your response should:

1. Define the User: Highlight the individual's specific needs and functional limitations as part of a broader workplace or educational population.
2. Analyze the Tasks: Outline the potential typical tasks the person performs in their environment and the barriers resulting from their disability or impairment.
3. Propose a Solution: Design appropriate changes in the environment or recommend assistive technologies to address the individual’s needs. Justify your choices based on accessibility, functionality, and ergonomic principles (e.g., desk height, AAC tools, eye-tracking devices).

4. Evaluate Feasibility: Assess the practicality and potential impact of your proposed solution in terms of cost, ease of use, and the user's independence and quality of life.

Deliverable: Prepare a 300–500 word report outlining your proposed solution. Include sketches, diagrams, or product examples to help illustrate your design concept.

Work Aids and Assistive Technology – Seminar slides

(Slides 4-5)

Objective: Define assistive technology and introduce its purpose in enhancing participation, reducing barriers, and supporting independence.

Engage the Students: Ask: "Can you name assistive technologies you've encountered in your daily life, workplace, or school?"

Use a live poll, Mentimeter, or simple brainstorming session on the board to collect diverse examples (e.g., hearing aids, screen readers, ergonomic chairs).

(Slide 6)

Objective: Explain the empowering role of assistive technologies in enabling individuals with disabilities to perform daily activities, communicate, and participate fully in society. Emphasize the diversity of tools—from low-tech aids to advanced digital systems.

Engage the Students: Display or pass around images of different assistive devices (e.g., prosthetic limbs, voice-to-text apps, screen magnifiers). Ask: "Which of these would be most transformative for someone you know—or for yourself? "Encourage small group discussion comparing high-tech vs. low-tech solutions in different environments (home, school, work).

(Slide 7)

Objective: Illustrate the diversity of assistive technology types, highlighting the distinction between low-tech and high-tech solutions, and various categories such as hardware and computer interfaces.

Engage the Students: Ask students to form small groups and assign each one a category (low-tech, high-tech, hardware, computer hardware). Each group should generate two examples, explain when and for whom the tools would be most helpful, and briefly present their ideas to the class.

(Slide 8)

Objective: Present the broad and inclusive scope of assistive technology, highlighting tools beyond physical aids—such as software, educational tools, and communication programs—that support learning, mobility, and autonomy.

Engage the Students: Invite students to brainstorm as many types of assistive technology as possible within 2 minutes, then ask them to categorize the examples into software, educational tools, mobility aids, and other. Use this to initiate a discussion on how different needs require different types of solutions.

(Slide 9)

Objective: Explain the core purpose of assistive technology in supporting independence, functionality, and social inclusion, particularly for persons with disabilities, older adults, and those with chronic conditions.

Engage the Students: Ask students to reflect on how assistive technology could change someone's daily experience. Prompt discussion with the question: "What does independence mean in the context of disability, aging, or chronic illness?" and let students share personal examples or hypothetical scenarios.

(Slide 10)

Objective: Highlight the broad societal and personal benefits of assistive technology, especially in fostering independence, access to education, employment, and social integration for people with disabilities.

Engage the Students: Invite students to discuss or write short reflections on how assistive technology might transform life opportunities for someone with a disability. Encourage sharing real-life examples or imagining solutions in education, employment, or social contexts.

(Slide 11)

Objective: Emphasize the essential role of assistive technology in fostering inclusion, communication, and participation for people with disabilities. Illustrate how such technology bridges the gap between limitations and full engagement in daily life and society.

Engage the Students: Prompt students to reflect on how assistive technology might impact someone's life emotionally and socially, not just functionally. Invite short group discussions or role-play exercises imagining a day in the life of someone using different assistive technologies.

(Slide 12)

Objective: Provide concrete examples of assistive technologies to illustrate their transformative impact on mobility, communication, and inclusion. Demonstrate how these tools empower individuals with physical and sensory impairments to participate more fully in society.

Engage the Students: Ask students to work in pairs and match assistive technologies with specific user needs (e.g., hearing loss → cochlear implant). Then, have each pair briefly describe a scenario where that technology could significantly enhance someone's life. This will help students connect theory to real-world application.

(Slide 13)

Objective: Highlight the role of assistive technology in promoting accessibility and inclusion in education and the workplace. Emphasize how specific tools remove barriers and enable participation on equal terms.

Engage the Students: Invite students to reflect on how they might use or have seen these technologies in action in schools or workplaces. Encourage them to form small groups and discuss how one assistive tool could be implemented in a typical classroom or office setting to support an individual with a specific need. This will help them understand the real-life applications and benefits of inclusive design.

(Slide 14)

Objective: Emphasize the broader societal importance of assistive technology, including benefits for families, healthcare systems, and social equity. Show how these technologies contribute to global well-being and reduce long-term care needs.

Engage the Students: Ask students to consider how society as a whole benefits from supporting people with assistive technologies. Use a think-pair-share method to explore questions such as: “How might assistive technology reduce public healthcare costs?” or “What impact can it have on family dynamics or aging populations?” Let them share examples or brainstorm policies that support equitable access to assistive solutions.

(Slide 15)

Objective: Present key employment statistics that illustrate the disparities faced by individuals with disabilities in the workforce and encourage reflection on the systemic barriers to employment equality.

Engage the Students: Ask students to interpret the data and discuss in small groups why employment rates for people with disabilities remain lower. Encourage them to brainstorm possible reasons (e.g., lack of accommodations, stereotypes, access to education) and propose ideas for policy or technological solutions that might improve these numbers. Use a quick quiz or poll to check understanding of employment ratios and their implications.

(Slide 16)

Objective: Illustrate and analyze labor force participation trends among people with disabilities, emphasizing how age and ability status influence employment involvement.

Engage the Students: Prompt students to consider the reasons for declining participation rates with age and disability status. Ask them to discuss how assistive technologies or workplace accommodations could change these trends. Use breakout discussions or quick reflective writing prompts to explore how public policy, workplace culture, or technological solutions might close the gap in participation rates.

(Slide 17)

Objective: Explain the impact of assistive technologies (AT) on employment outcomes for people with disabilities and highlight current gaps in workplace accommodations.

Engage the Students: Encourage students to reflect on why access to assistive technologies and accommodations remains limited despite their proven benefits. Ask them to brainstorm strategies organizations could adopt to improve inclusion. As a learning activity, have students develop a mock policy or campaign that promotes the use of AT in the workplace, backed by data from the slide.

(Slide 18)

Objective: Illustrate how the COVID-19 pandemic catalyzed the integration of assistive technologies in the workplace, fostering greater accessibility and inclusion for workers with disabilities.

Engage the Students: Prompt students to discuss how remote work environments may have leveled the playing field for employees with disabilities. Ask them to analyze whether these pandemic-driven changes are sustainable post-COVID. Encourage debate on the role of technology versus organizational culture in long-term inclusion, and have students propose tools or practices that should remain standard in hybrid or remote workplaces.

(Slides 19-25)

Slide: Pre-2020 Employment Disparities for People with Disabilities

Engage the Students: Invite students to reflect on why, before 2020, employment outcomes for people with disabilities remained significantly lower than for others despite incremental progress. Ask them to brainstorm systemic barriers—such as biases, lack of accommodations, or policy gaps—and discuss how these might be addressed in the design of inclusive workplaces. Encourage students to propose specific employer actions or policy changes that could have accelerated improvement prior to the pandemic.

(Slides 26-31)

Slide: Unmet Global Need

Engage the Students: Ask students to reflect on the ethical and social implications of a world where only 3% of people in some low-income countries have access to needed assistive technologies, compared to 90% in high-income nations. Challenge them to think beyond the numbers—what does this disparity mean for education, employment, or dignity in different parts of the world? Encourage a short discussion on potential global strategies to bridge this accessibility gap.

(Slides 32-44)

Slide: Practicalities of How People with Disabilities Can Work Thanks to Assistive Technology

Engage the Students: Pose the question: "Can you imagine what everyday tools—like a speech-generating device, eye-tracking software, or ergonomic keyboard—might mean for someone with cerebral palsy in a professional setting?" Encourage students to brainstorm examples of assistive technology they've seen or used, and discuss how these tools transform access to work, particularly in tech-based roles. You could also ask: "What might inclusive design look like in your future workplace?"

(Slides 45-54)

Objective: Demonstrate how assistive technology enables individuals with cerebral palsy to engage in full-time employment, particularly in computer-based roles, using adapted input methods.

Engage the Students: Ask students to analyze how specific assistive tools like sip-and-puff devices or on-screen keyboards transform access to digital tasks. Encourage them to brainstorm other professional roles that could become accessible with similar technologies and discuss how design can be more inclusive for motor-impaired individuals.

(Slides 55-63)

Objective: Introduce the function and significance of induction loop systems and hearing aids as assistive technologies that improve auditory accessibility for individuals with hearing impairments in various environments.

Engage the Students: Ask students if they have ever seen or used induction loop systems in public spaces (e.g., auditoriums, banks, classrooms). Encourage them to research or describe how these systems work in conjunction with hearing aids. As an activity, simulate a noisy communication scenario and discuss how induction technology changes the clarity of the message.

(Slide 64)

Objective: Help students understand the conceptual difference between assistive technologies (which address specific individual needs) and universal design (which aims to make environments, products, and services accessible to all people, regardless of ability, without the need for adaptation).

Engage the Students: Encourage students to brainstorm examples of both assistive technologies and universal design in everyday life. Ask them to reflect on places they've visited—such as schools, public transportation, or websites—and identify which elements were designed universally and which required additional assistive tools. This comparison will help solidify the distinction through real-world observation.

(Slides 65-73)

Objective: To explore the variety of advanced wheelchair technologies and their roles in promoting independence, mobility, and participation in everyday and specialized activities for people with mobility impairments.

Engage the Students: Show short clips or images of walking, stair-climbing, or sports wheelchairs in use. Ask: What problems are these devices solving? Start a discussion: What's the difference between a "standard" wheelchair and a specialized one? Ask students to brainstorm environments where these technologies might be especially useful (e.g., sports arenas, urban settings, schools without elevators). Encourage students to reflect: How would their daily routines change if they used a wheelchair like these?

(Slides 74-82)

Objective: To showcase real-world examples of how companies have successfully integrated assistive technologies to create inclusive workplaces for employees with disabilities, inspiring critical thinking about workplace accessibility.

Engage the Students: Present each case study as a mini-story and ask: What made this example successful? Prompt discussion: Have you seen examples like this in your community or country? Ask students to analyze: What role did assistive technology play? Could the same outcome be achieved without it? Invite students to brainstorm additional industries where these practices could be adopted.

(Slides 83-84)

Objective: Summarize the discussion on assistive hearing technologies—such as hearing aids and induction loop systems—highlighting their role in promoting accessibility and inclusion in work and public environments, and reflecting on their functionality, benefits, and integration challenges.

Engage the Students: Invite students to reflect on situations where background noise or poor acoustics made it difficult for them to hear. Then introduce the concept of

induction loop systems as a way to create clear, direct sound transmission for people using hearing aids. Encourage discussion by asking how such solutions could be incorporated into places they frequent—such as classrooms, theatres, or offices—and what barriers might still exist despite the technology.

5 Conclusion

This Transferability Guide has been developed as a concluding output of the ERGOART project with the purpose of ensuring that the project results remain usable, adaptable, and relevant beyond the project lifetime. By bringing together the project's training modules, methodological approaches, and practical tools, the guide demonstrates how the developed content can be transferred and applied in different national, institutional, and professional contexts.

The guide emphasizes practical usability by preserving the structure and logic of the training materials, including slide-based content and manuals for trainers. This approach enables education and training providers, trainers, and other stakeholders to directly reuse or adapt the materials according to their specific needs, while maintaining the core principles of ergonomics, inclusion, and accessibility promoted by the ERGOART project.

Through its integrated framework, the Transferability Guide highlights the interconnections between ergonomics principles, work demands analysis, disability-related considerations, inclusive and universal design, and assistive technologies. This holistic perspective supports a comprehensive understanding of inclusive workplace design and the employment of persons with disabilities, while allowing flexibility in implementation across different environments.

In conclusion, the Transferability Guide serves as a practical and strategic resource that supports the dissemination, sustainability, and long-term impact of the ERGOART project. By facilitating the transfer and adaptation of project results, it contributes to the promotion of inclusive employment practices and the creation of accessible and supportive working environments for persons with disabilities at the European level and beyond.