Gamifying Safety Training for Sustainable Work in Waste Management Plants: The SOHS Project

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RESEARCH PROBLEM

The UN 2030 Agenda promotes the development of the green economy and efficient waste management. However, the sustainability perspective has often focused on the positive environmental and economic aspects of "**green jobs**", leaving key social and labour aspects, such as **Occupational Safety and Health (OSH)**, underestimated. The complexity of integrated **Municipal Solid Waste (MSW)** management systems poses new OSH challenges for people employed in these facilities due to various risk factors and unpredictable waste materials. **Safety training** is vital for business competitiveness and injury prevention, and the evolution of training approaches through the **integration of digital technologies** becomes essential for greater accessibility in terms of time- and cost-effectiveness. **The Sustainable Occupational Health and Safety (SOHS)** project addresses these challenges through a **human-centered ergonomic approach**.
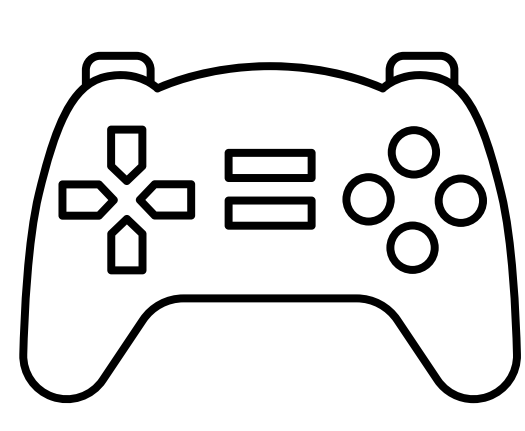
OBJECTIVES
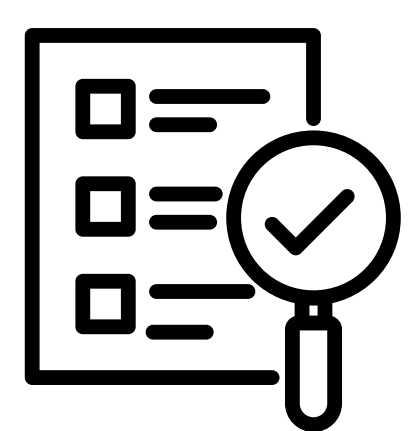
Conducting a **multidimensional occupational risks assessment** in **3 waste management plants** in **Italy**
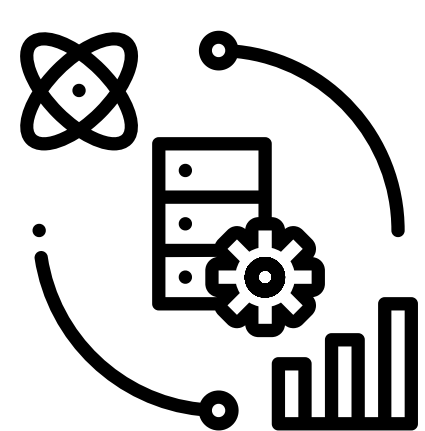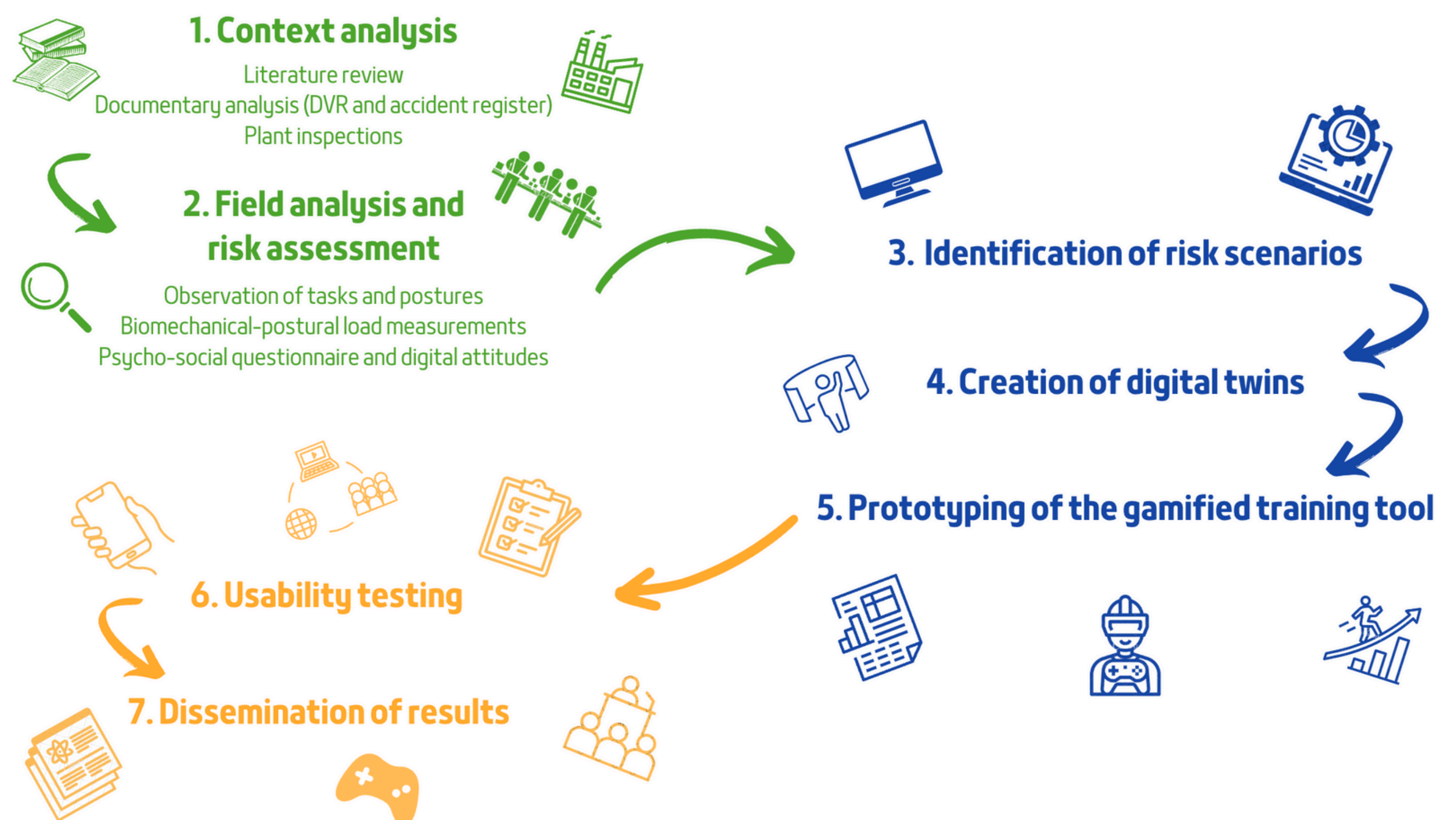
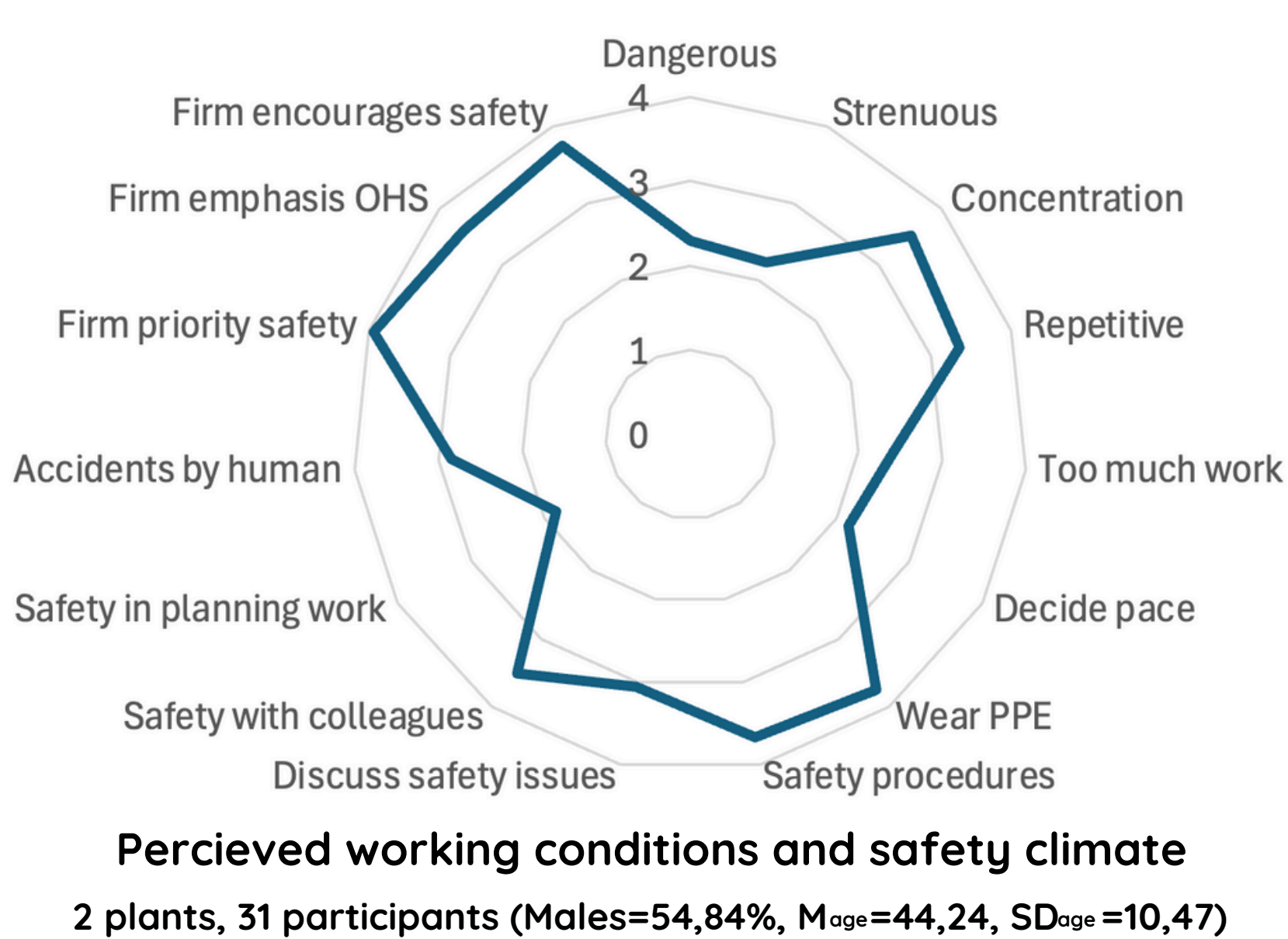Creating a **digital twin** of the **risk scenarios** detected in the **investigated plants**

Crafting a **prototype** for a **gamified training solution** and **testing** its **usability**
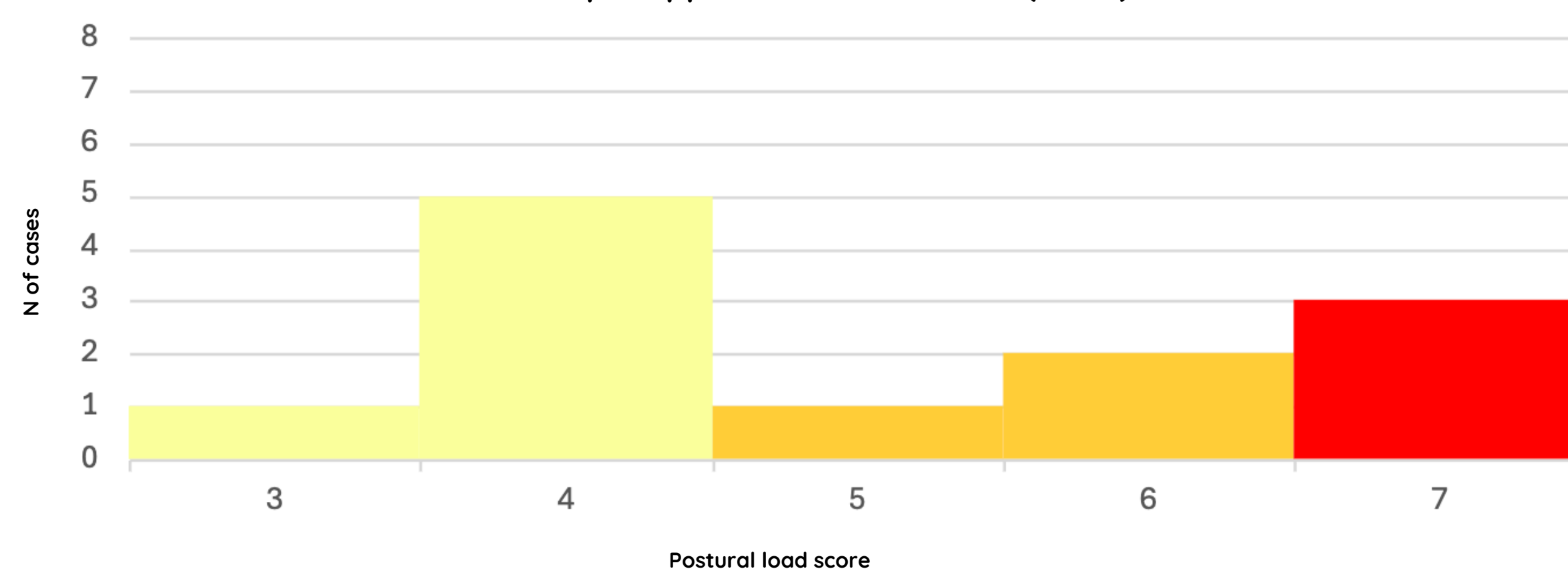
MATERIALS AND METHODS

1. **Context analysis**
Literature review
Documentary analysis (DVR and accident register)
Plant inspections

2. **Field analysis and risk assessment**
Observation of tasks and postures
Biomechanical-postural load measurements
Psycho-social questionnaire and digital attitudes

3. **Identification of risk scenarios**

4. **Creation of digital twins**

5. **Prototyping of the gamified training tool**

6. **Usability testing**

7. **Dissemination of results**

FIRST RESULTS AND IMPORTANCE

WORK AND SAFETY

Percieved working conditions and safety climate
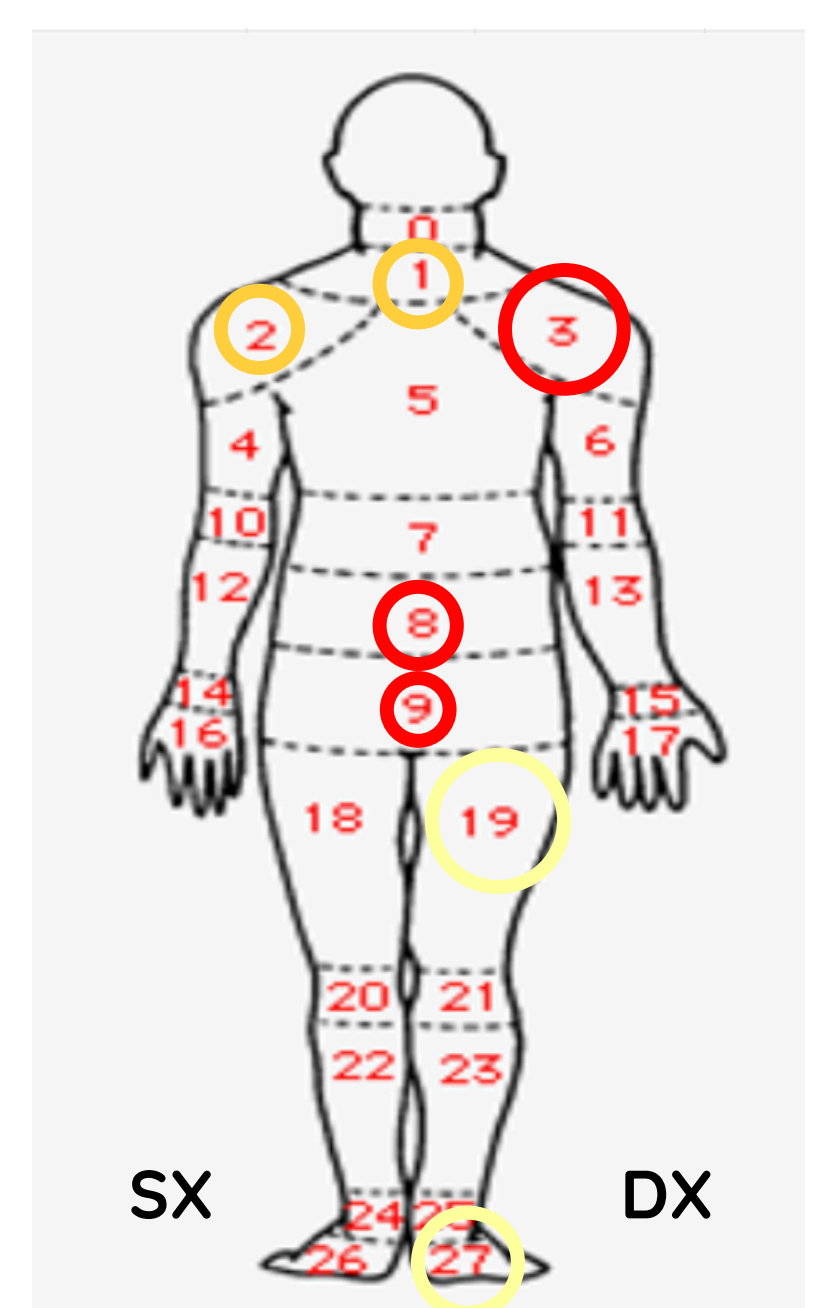2 plants, 31 participants (Males=54,84%, M_age=44,24, SD_age=10,47)

Rapid Upper Limb Assessment (RULA)

Observed postural load and perceived body discomfort
2 plants, 12 participants (Males=58,33%, M_age=48,27, SD_age=10,93)

SX   DX

The risk assessment phase is ongoing. Workers perceived their work as demanding, but they also noticed the company's great attention to OSH issues. The RULA results and the discomfort perceived by workers pointed out the need for ameliorative changes to work stations and tasks. The prototyped training tool will build on evidence from risk assessment to provide a customized, engaging and effective solution for identifying OSH risks and behaviors to avoid. It may be adopted industry-wide in the waste management sector.