IMECC
Innovative Manufacturing Engineering Systems Competence Centre

Co-funded by the Erasmus+ Programme of the European Union

INLEARC

INTELLIGENT E-LEARNING SYSTEMS IN ROBOTICS/MECHATRONICS

OVERVIEW OF THE RESULTS

PROJECT PARTNERS

- Innovative Manufacturing Systems Competence Centre - IMECC
- Tallinna Tööstushariduskeskus Estonia - TTHK
- SEINAJOEN AMMATTIKORKEAKOULU OY Finland - SeAMK
- Profesionalas izglitibas kompetences centrs "Rigas Tehniska koledza„ Latvia - RTK

MAIN OUTPUTS

O1

- Methodology for digital competences in the field of robotics/mechatronics
- 01.09.2019 – 30.09.2021

O2

- Artificial intelligence (AI) enabled smart e-learning materials for future specialists of robot-based workplaces
- 01.01.2020 – 30.06.2022

O3

- Integration of Digital Intelligent Education in Robotics/Mechatronics into Digital Learning Platform (DLP)
- 01.07.2020 – 30.06.2022

BASIC KNOWLEDGE NEEDED FOR WORKING IN ROBOTIC WORKPLACE

Principles of selection and use of robots

Equipment maintenance

Seadmete ohutus

Product manufacturing technology

Robot coordinate systems and programming

Use of tools

Actuators - their classification and nature

Planning robot work cycle

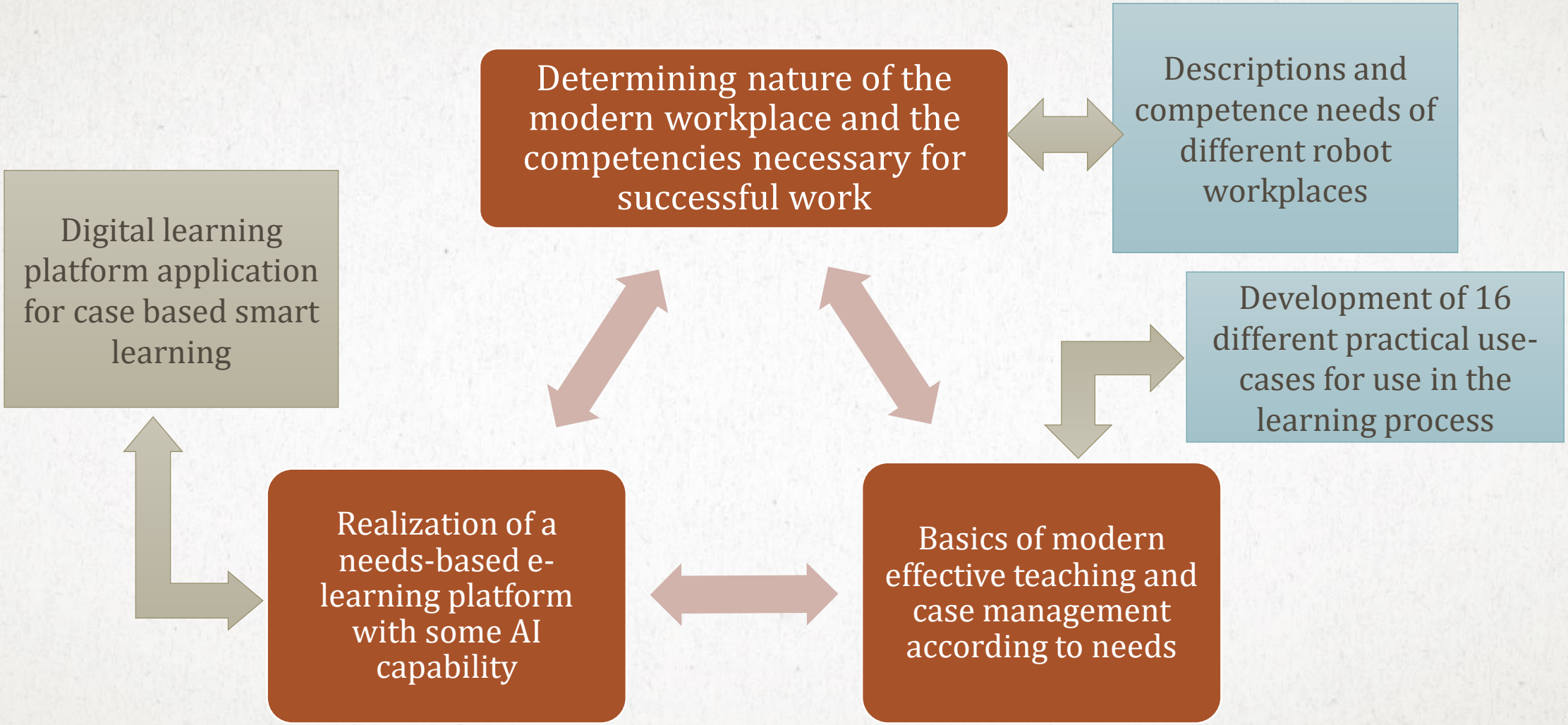
Sensors and cameras, their nature and need for use

Robot off-line programming

Designing a robotic workplace

Robotic workplace performance

IMPORTANT ACTIVITY FOCUSES OF THE PROJECT

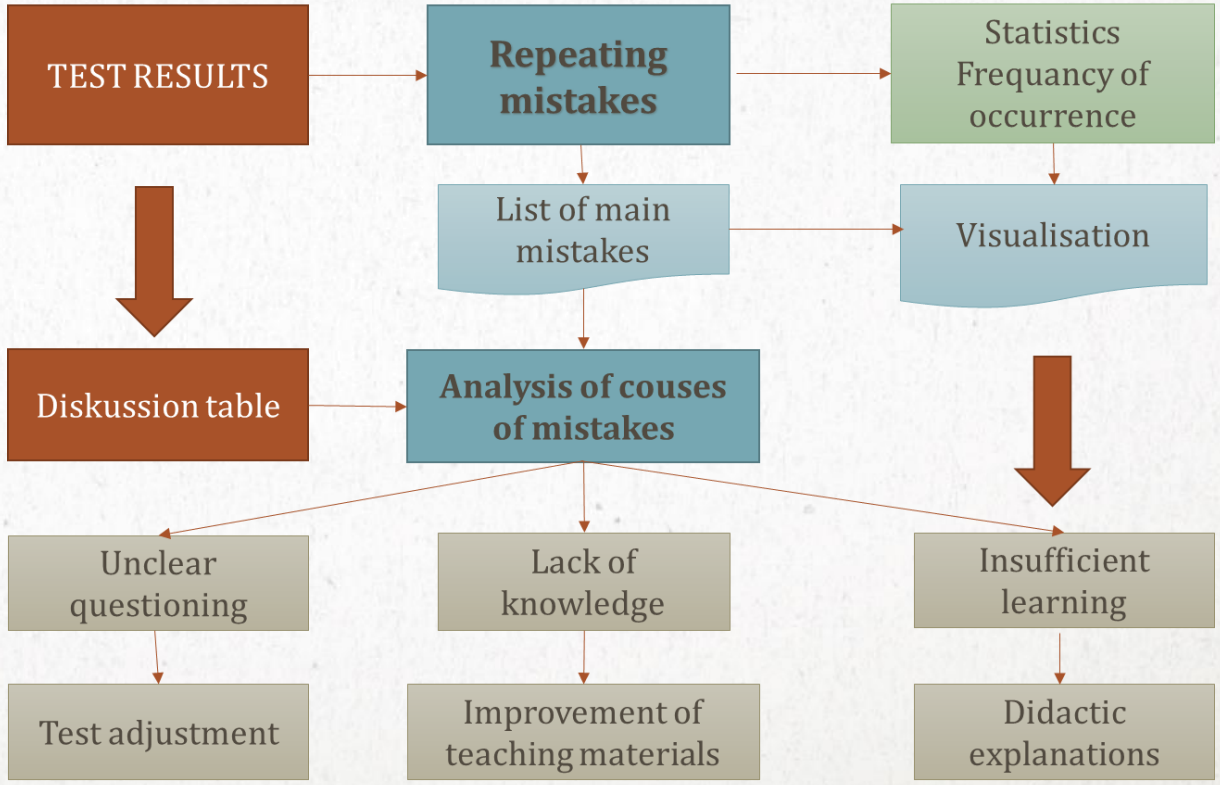


QUANTITATIVE INDICATORS OF THE PROJECT INTELLECTUAL OUTPUTS

- methodology for digital competences in the field of robotics/mechatronics - 1
- competence charts for robot operator, robot systems technician, production mechatronics, systems engineer - 12 (3 per participating country)
- robot-based workplace functionality description – 12-15 (4-5 per participating country)
- smart e-learning materials for digital use - 16 (4 per participating organization)
- text-book (digital library) – content and operating principles - 1
- selected digital learning platform in function – 1
- plan of exploitation and expansion of results, including concept of cooperation network - 1

OBJECTIVE OF THE INTELLECTUAL OUTPUT 2

- The main objective was to develop advanced smart e-learning materials in the field of industrial robotics/mechatronics for future specialists of robot-based workplaces using artificial intelligence (AI).



USE-CASES, LEADED BY IMECC, IN COOPERATION WITH TTHK, SEAMK, RTK

- 1) Task O2/A2-1.1 Robot-based workplace description and use in practice
- 2) Task O2/A2-1.2 Industrial robot functionality and coordinate systems
- 3) Task O2/A2-1.3 Robot-bending cycle development
- 4) Task O2/A2-1.4 Robot end-of-arm tooling

USE-CASES, LEADED BY TTHK IN COOPERATION WITH IMECC, SEAMK, RTK

- 1) Task O2/A2-2.1 Press-brake machine and its technical capabilities
- 2) Task O2/A2-2.2 Robot-bending technology
- 3) Task O2/A2-2.3 Robot-bending tools
- 4) Task O2/A2-2.4 Industrial robot programming

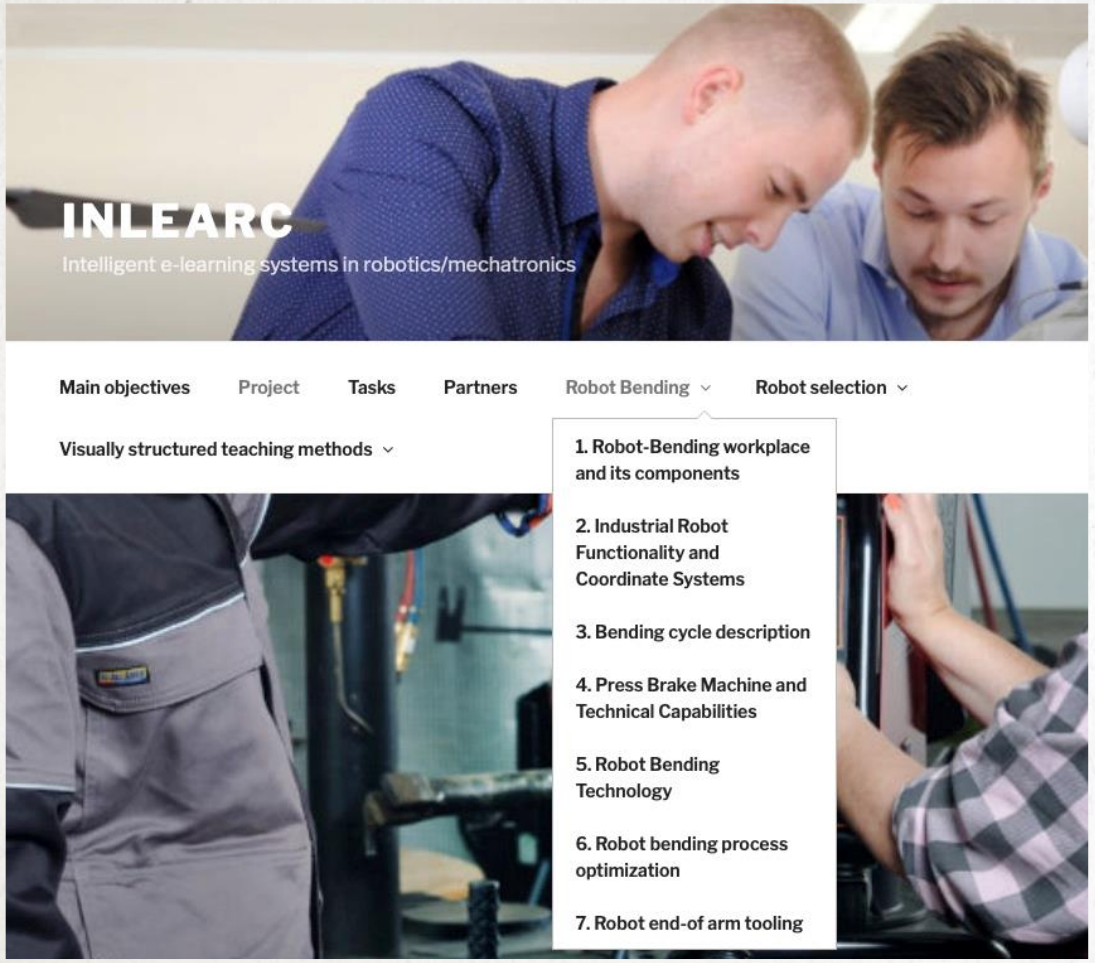
USE-CASES, LEADED BY SEAMK IN COOPERATION WITH IMECC, TTHK, RTK

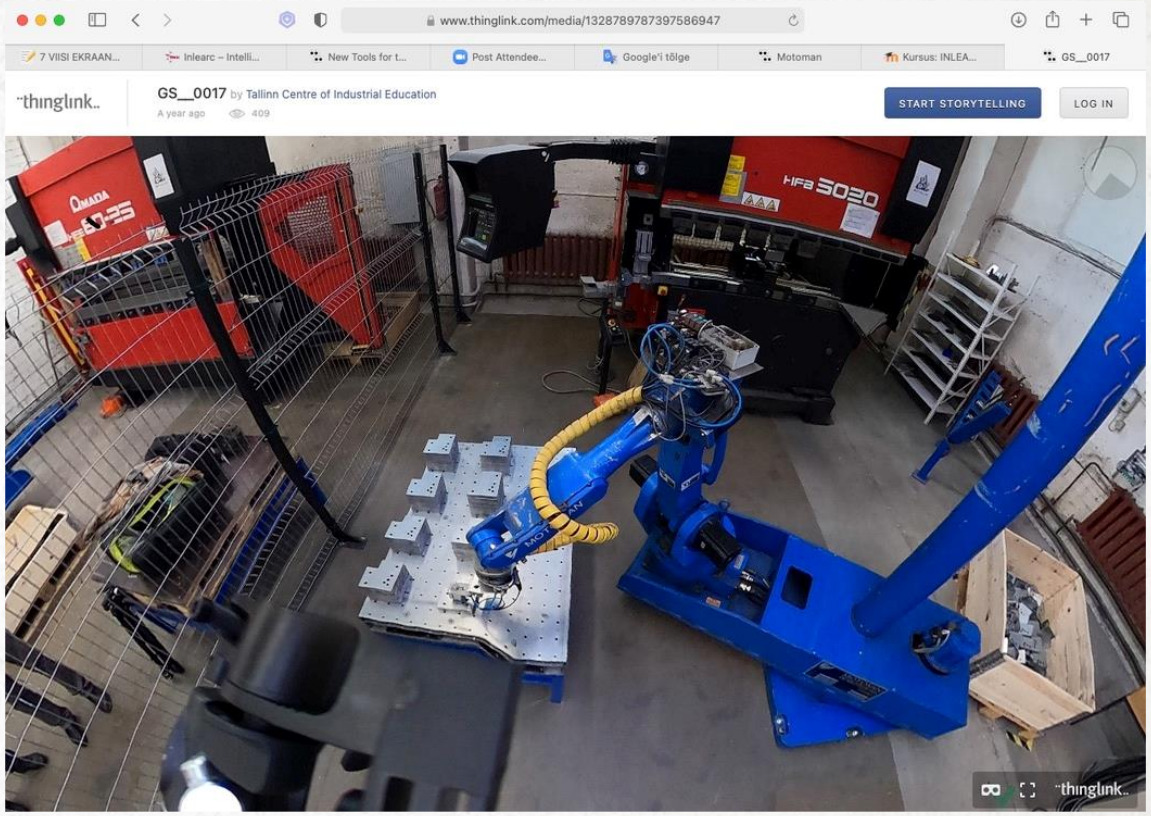
- 1) Task O2/A2-3.1 Simple assembly tasks with a collaborative robot
- 2) Task O2/A2-3.2 Off-line programming of welding robots
- 3) Task O2/A2-3.3 Machine vision based on pick-and place applications with industrial robots
- 4) Task O2/A2-3.4 Data aquisition from a robot-cell and vizualization of the data applying cloud-based services

USE-CASES, LEADED BY RTK IN COOPERATION WITH SEAMK, TTHK, IMECC

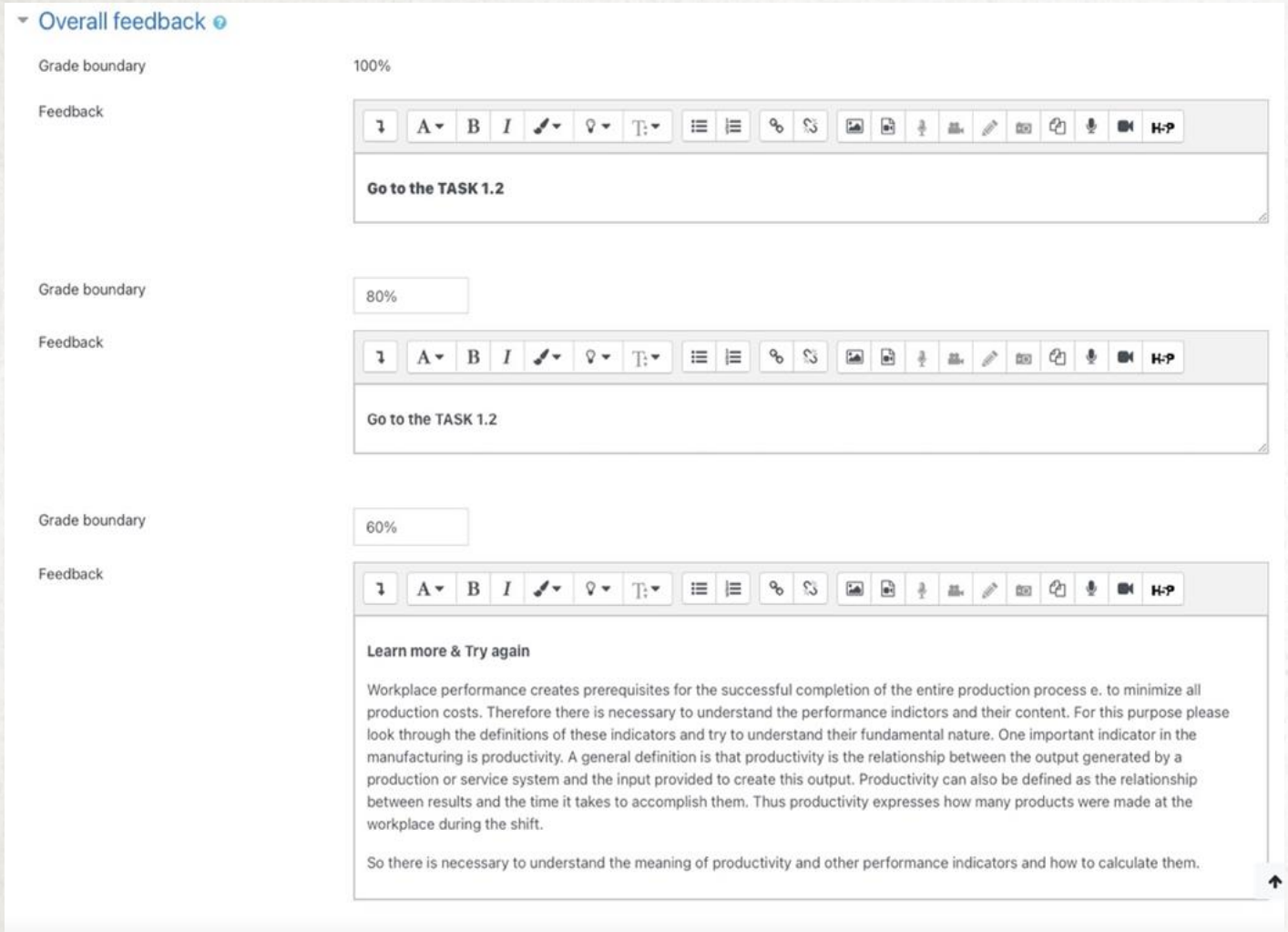
- 1) Task O2/A2-4.1 Safety devices for industrial robots in production operations
- 2) Task O2/A2-4.2 Robot-cell design and simulation for manufacturing
- 3) Task O2/A2-4.3 Industrial robot maintenance for metal processing operations
- 4) Task O2/A2-4.4 Industrial robot smart end-effectors for CNC machines

DIGITAL E-LEARNING PLATFORM(MOODLE-BASED) IN PRACTICE





APPLICATION OF AI IN DIGITAL E-LEARNING PLATFORM



FEEDBACK I

RESULTS	ACTIVITY
85 - 100%	**Go to the TEST 1.2** **Everything is very OK**
61 - 84%	**Go to the TEST 1.2** **You have failed with the question No ….** (show the number what was incorrect)
Less than 60 %	**Learn more &** **Try again**

Please have an understanding about robot-based bending workplace, its functionality and basic components (bending robots and press-brake machine, etc.). Make clear what is important for designing the bending cycle. What role they have for fulfil the industrial task. Also is necessary to understand what do we mean under the production task – what parameters are used for determining the task (what is necessary to know before starting the production.

Also very important is to understand what is the layout of the robot-based workplace and what role the layout has. The Layout determines the positions of the equipment in the workplace and accesses to them. Good workplace layout minimizes the cycle time.

Please think more detailed way about the bending cell, the components of this cell, their functionality and what is necessary to do for fulfilling the production task and what parameters are describing it. LOOK to the given materials and if necessary to the added LITERATURE.

Look to the questions, you have failed. First try to find the right answers in the teaching materials. For more deep understanding, see added literature