

CoLED

Collaborative Learning Environment for engineering education

Intellectual Output 2

CoLED Guidelines

*Collaborative Learning Environment for
engineering education - CoLED*

Project Ref. No: 2018-1-PL01-KA202-050777

Version 2, Dec 2020



Erasmus+



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Introduction - COLED as an e-Learning Platform and a tool for Collaborative Learning in Engineering (CLE)

The current document is developed within project “**Collaborative Learning Environment for engineering education - CoLED**” (ref. no 2018-1-PL01-KA202-05077) which has been funded with support from the European Commission through Erasmus + Programme, Key Action 2: Cooperation for innovation and the exchange of good practices.

The Guidelines are meant to advice:

- ✓ entrepreneurs and employees of enterprises who want to enhance competitiveness of their companies as well as improve their qualification;
- ✓ future entrepreneurs and students who want to develop business in manufacturing sector;
- ✓ VET teachers and trainers who want to teach this course and therefore need to be at ease with course and platform before be a tutor;
- ✓ Learners to apply the outcomes of the EU funded ERASMUS+ project “CoLED”.

The main aim of the document is to provide the tools and methodologies to help entrepreneurs and employees of enterprises, future entrepreneurs and students efficiently use the e-Learning platform with a view to developing the vocational skills in the field of industrial automation in the manufacturing activities and practices, which are dramatically needed to support European SME’s growth in the manufacturing sector.

VET teachers, trainers and mentors in both schools and in work-based settings need to take on the challenge and opportunities of digital era technologies by an innovative open eLearning platform supporting of collaboration learning.

To ensure these facilities, manufacturing SMEs have to overcome some major obstacles, such as:

- the problem of limited resources in engineering training;
- the reluctance of industry employees regarding e-learning and new technologies.

COLED training platform was developed in order to provide SMEs in the manufacturing sector with accessible and flexible training in industrial automation, which could be used, adapted and customized to their specific needs.

Therefore, the COLED learning platform can be used in different ways, depending on the specific needs of the user. In addition, it allows both trainers and learners who use it for their own training to adapt new e-learning tools and methodologies to a personalized learning process.

This guide intends to advise and provide a practical methodology to SME staff interested in specific COLED industrial automation training, to get the most out of it.

It is structured around 4 simple questions:

- I. What is the COLED training?
- II. What training methodology is used?
- III. Who will benefit from CoLED learning course?
- IV. How can CoLED course be employed to the best advantage of its users?

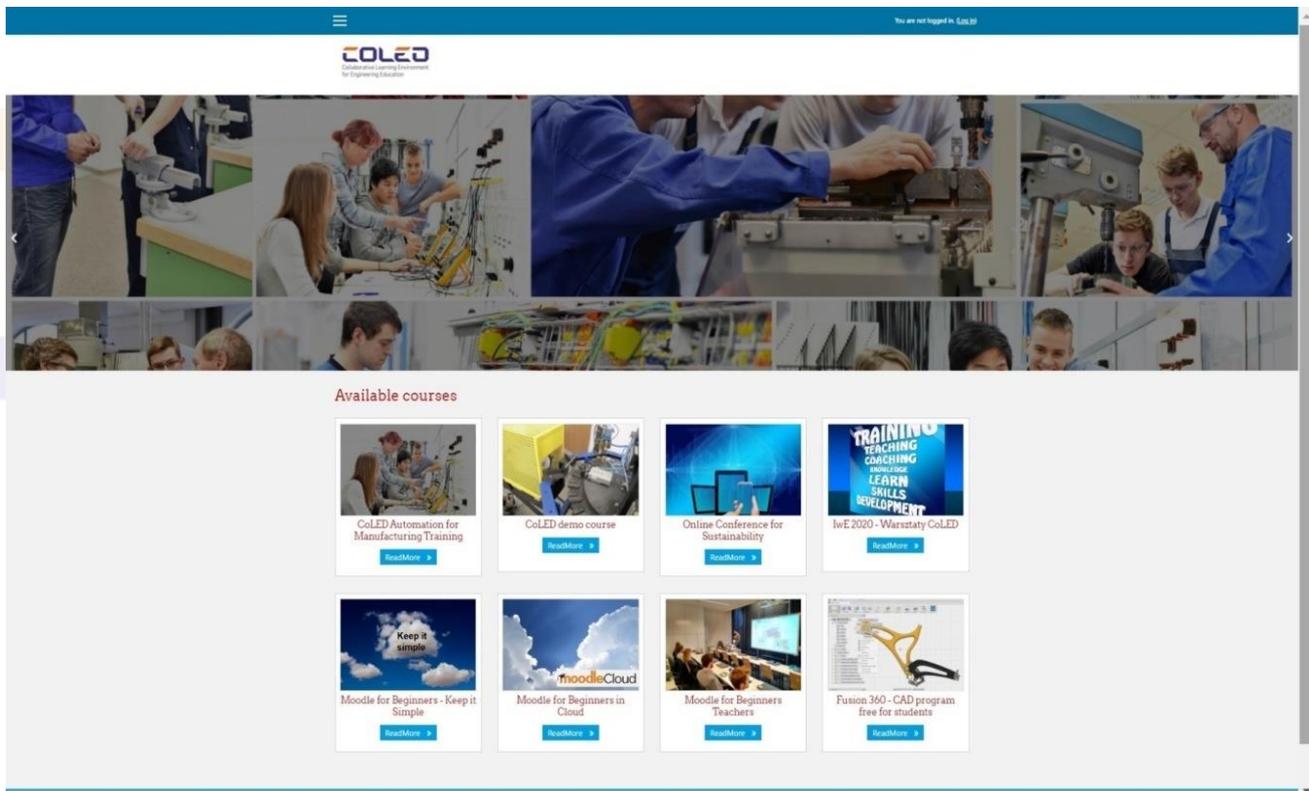
But first, let us start with the CoLED platform user's guide!

- How do you log in / create your account?
- What can you do with your profile options?
 - How can you change your language?
 - How can you monitor your progress?
 - and finally, your certificate!

The CoLED platform users' guide – QUICK USERS GUIDE

How do you log in / create your account?

Go to <https://coled.moodle.pl/>



If you are a registered user just login:

You are not logged in.

COLED
Collaborative Learning Environment
for Engineering Education

Username
Password
 Remember username

LOG IN

Forgotten your username or password?
Cookies must be enabled in your browser
Some courses may allow guest access

LOG IN AS A GUEST

Is this your first time here?
For full access to this site, you first need to create an account.
CREATE NEW ACCOUNT

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Data retention summary

If this is your first time on the CoLED platform, please create a new account:

You are not logged in.

COLED
Collaborative Learning Environment
for Engineering Education

Username
Password
 Remember username

LOG IN

Forgotten your username or password?
Cookies must be enabled in your browser
Some courses may allow guest access

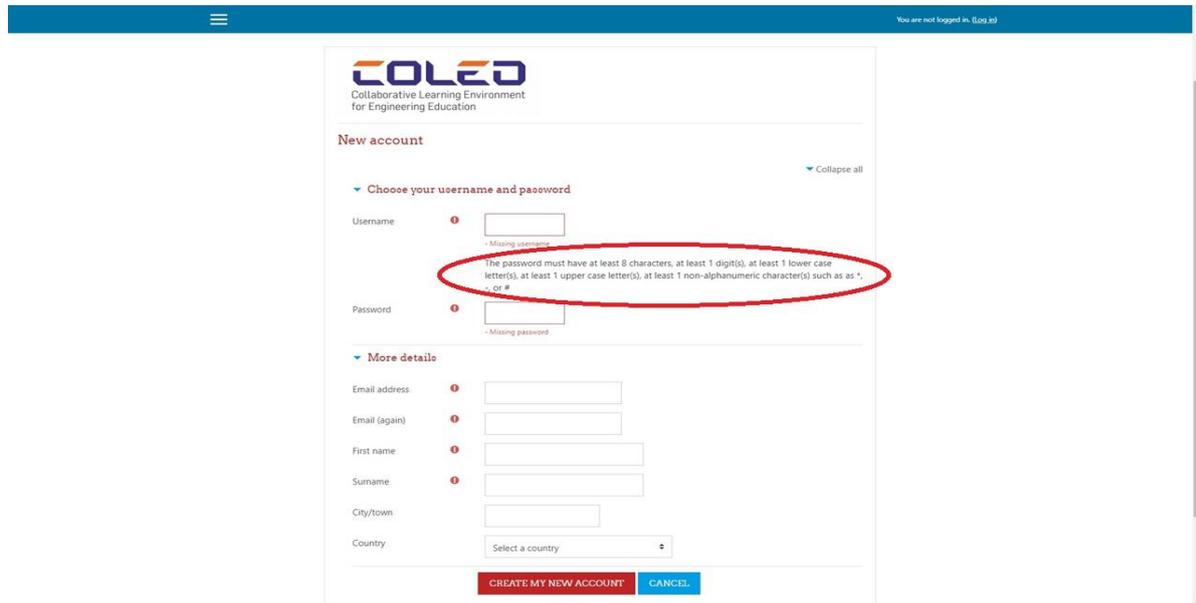
LOG IN AS A GUEST

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Data retention summary

Take care about length, letters and characters in your username and password:



The screenshot shows the 'New account' registration page. Under the 'Choose your username and password' section, the password field has a red error message: "The password must have at least 8 characters, at least 1 digit(s), at least 1 lower case letter(s), at least 1 upper case letter(s), at least 1 non-alphanumeric character(s) such as *, -, or #". Below this, the 'More details' section contains fields for Email address, Email (again), First name, Surname, City/Town, and Country.

According to the instructions **“The password must have at least 8 characters, at least 1 digit(s), at least 1 lower case letter(s), at least 1 upper case letter(s), at least 1 non-alphanumeric character(s) such as as *, -, or #”**

When you are registered, you will get the following message:



The message box contains the following text: "An email should have been sent to your address at **Your e-mail**. It contains easy instructions to complete your registration. If you continue to have difficulty, contact the site administrator." Below the text is a blue button labeled "CONTINUE".

Check your e-mail (inbox or spam) in order to confirm your new account:



Zbigniew Jarosik (via CoLED) <noreply@coled.moodle.pl>

to me ▾

Hi Coled Project,

A new account has been requested at 'CoLED'
using your email address.

To confirm your new account, please go to this web address:

<https://coled.moodle.pl/login/confirm.php?data=uTJkEadla0hxMrM/coled>

In most mail programs, this should appear as a blue link
which you can just click on. If that doesn't work,
then cut and paste the address into the address
line at the top of your web browser window.

If you need help, please contact the site administrator,

Admin User

You will get the message with your name instead of

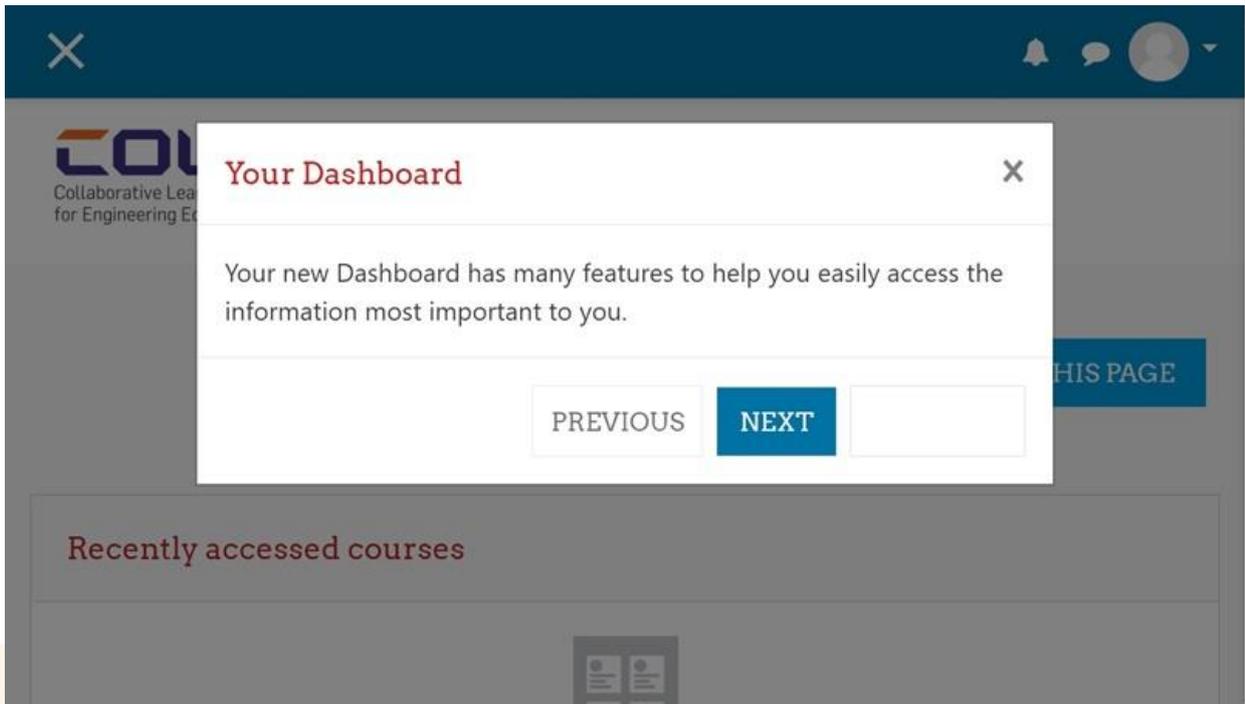
.....

Thanks,

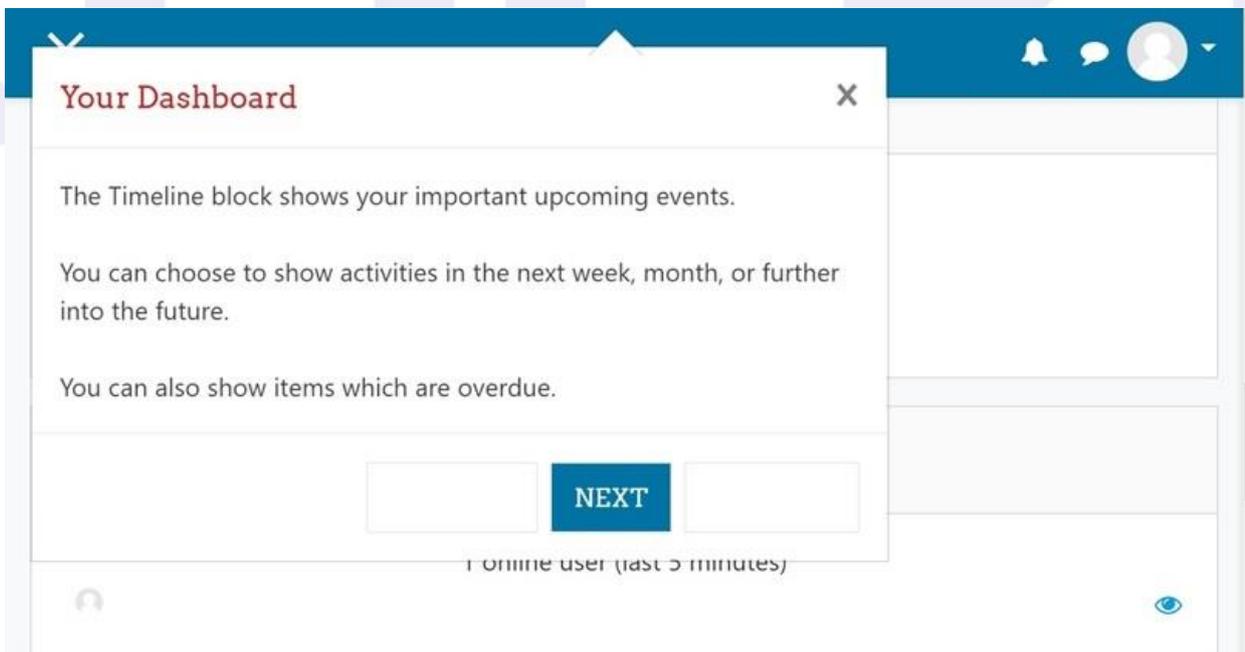
Your registration has been confirmed

CONTINUE

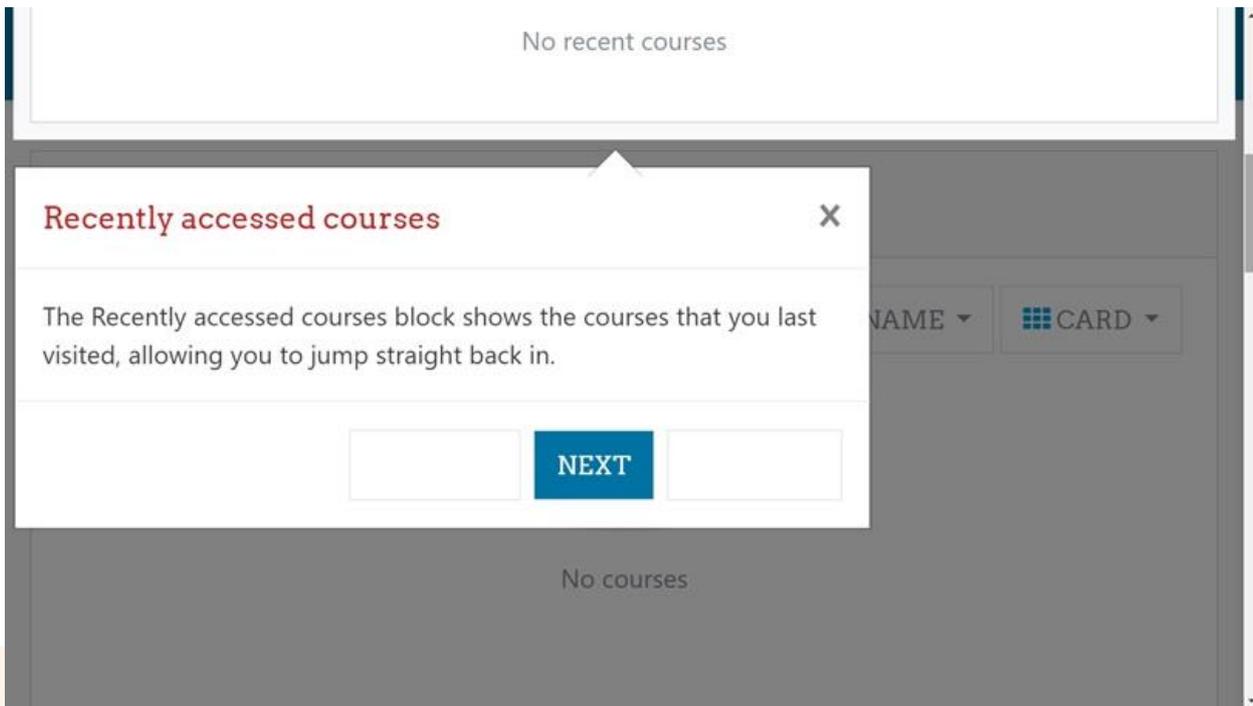
After your first login, start a tour about your Dashboard:



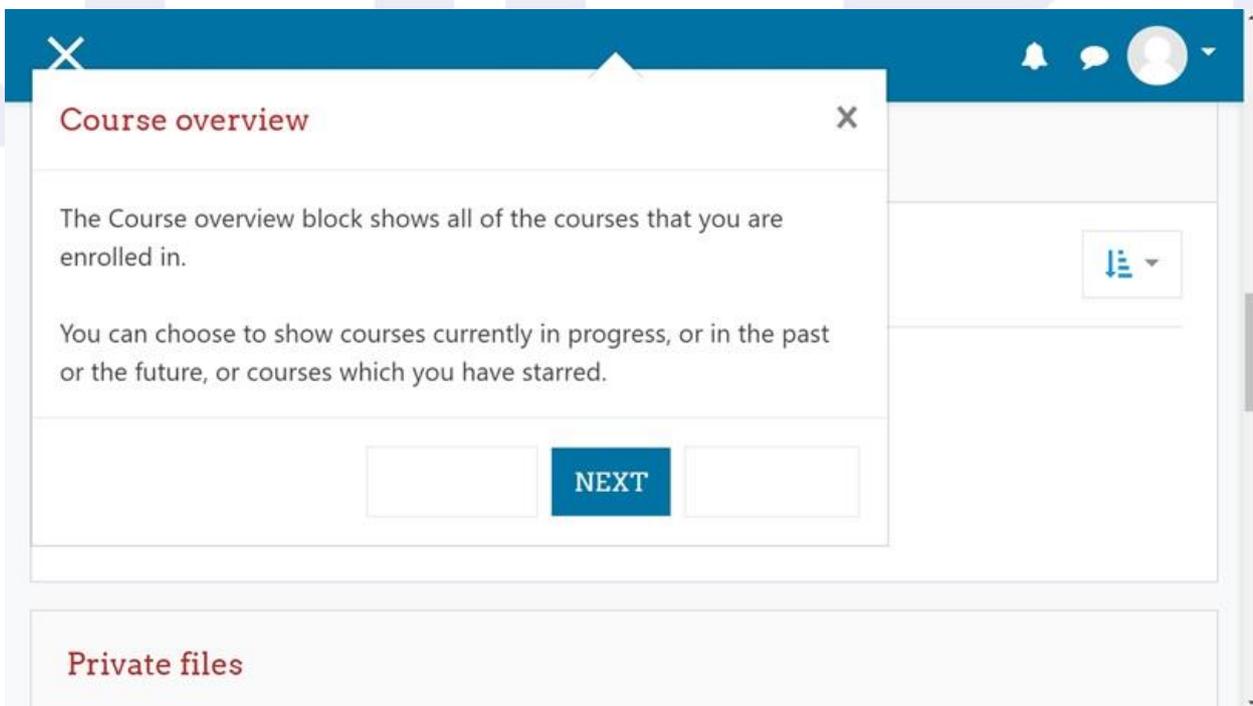
Your Dashboard tour – part 2



Your Dashboard tour – part 3



Your Dashboard tour – part 4



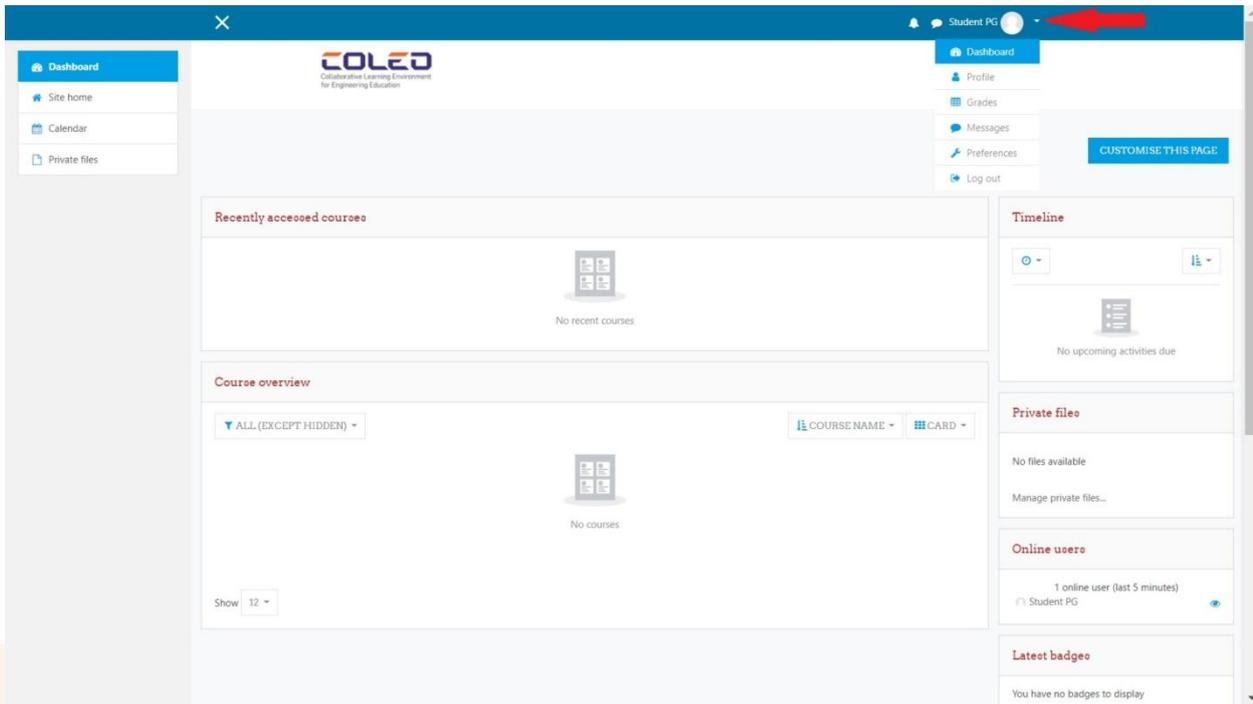
Your Dashboard tour – part 5

The screenshot shows the 'Course overview' section of a dashboard. At the top, there is a blue header bar with a close button (X), a notification bell, a chat bubble, and a user profile icon. Below the header, the 'Course overview' title is displayed. A filter dropdown is set to 'ALL (EXCEPT HIDDEN)'. To the right, there are two dropdown menus: 'COURSE NAME' and 'CARD'. A 'Display options' dialog box is open in the center, containing the following text: 'Courses may be sorted by course name or by last access date. You can also choose to display the courses in a list, with summary information, or the default 'card' view.' At the bottom of the dialog, there is a 'NEXT' button. In the background, a 'Show 12' dropdown is visible.

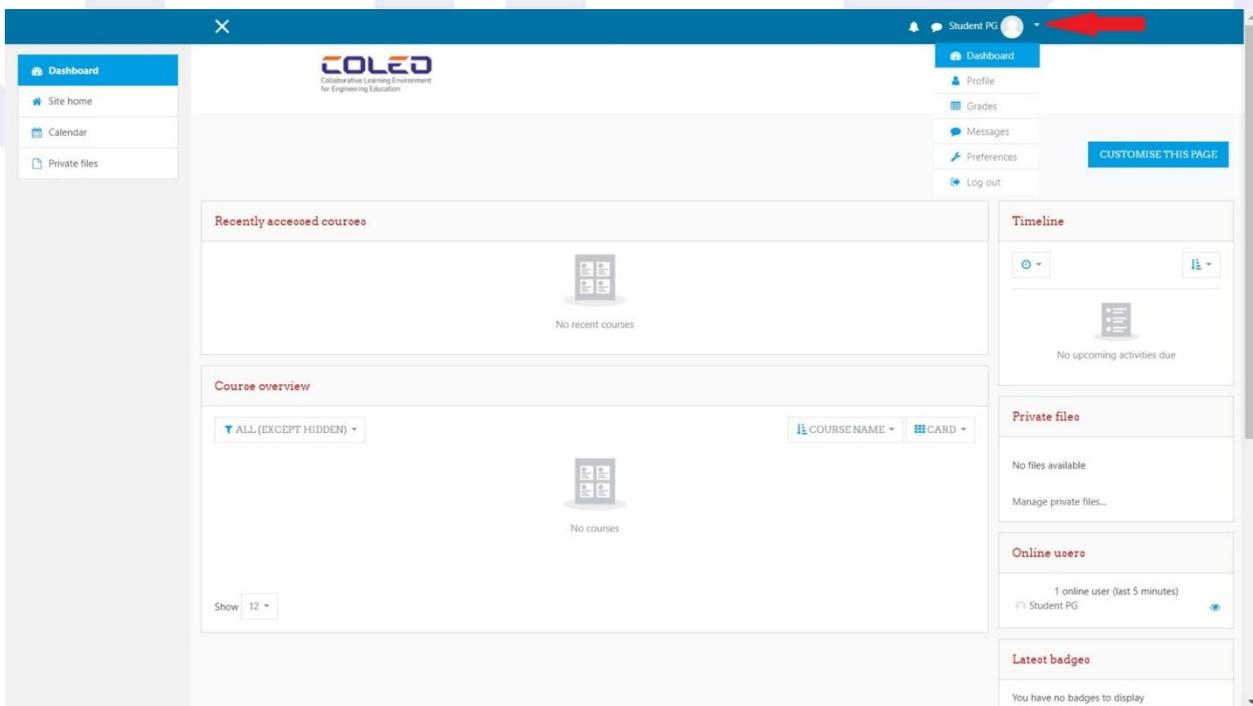
Your Dashboard tour has ended. You should now know your way around and what your personal Dashboard is.

The screenshot shows the 'End of tour' dialog box overlaid on the 'Timeline' section. The dialog box contains the text: 'This is the end of your user tour. It won't show again unless you reset it using the link in the footer.' A 'NEXT' button is located at the bottom of the dialog. In the background, the 'Timeline' section is visible, featuring a 'Show 12' dropdown, a refresh icon, and a 'No upcoming activities due' message with a calendar icon.

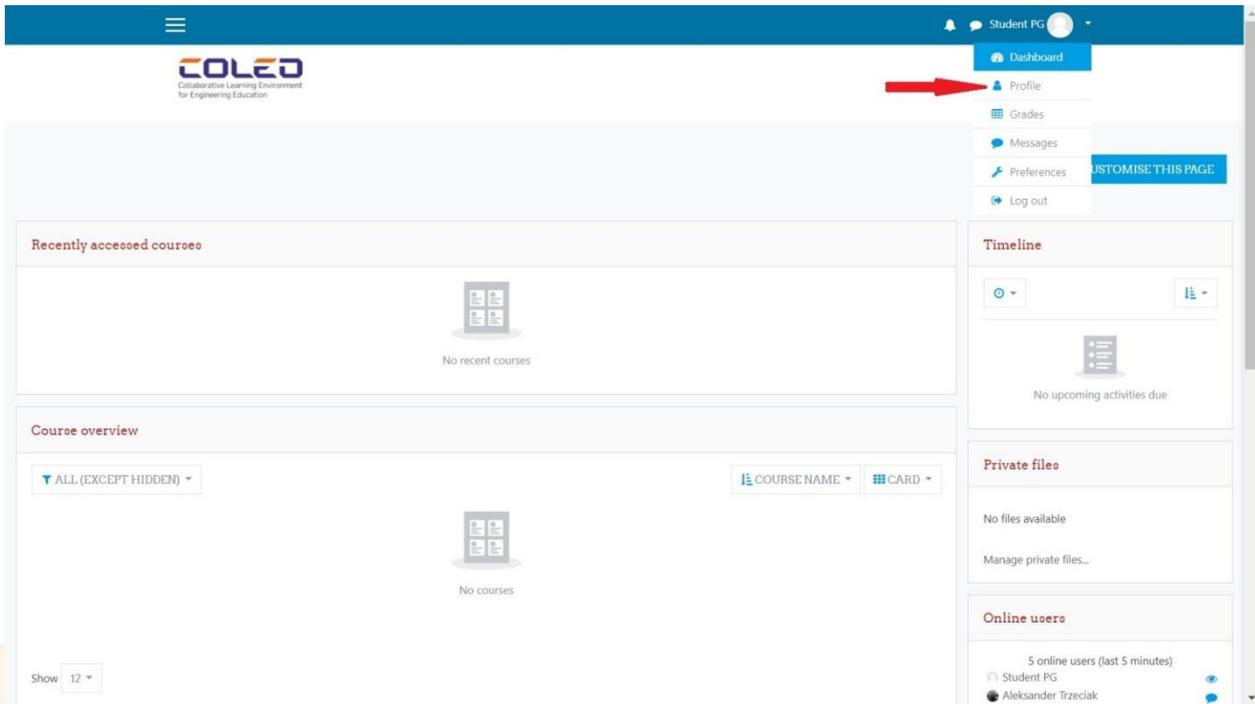
Explore your profile options



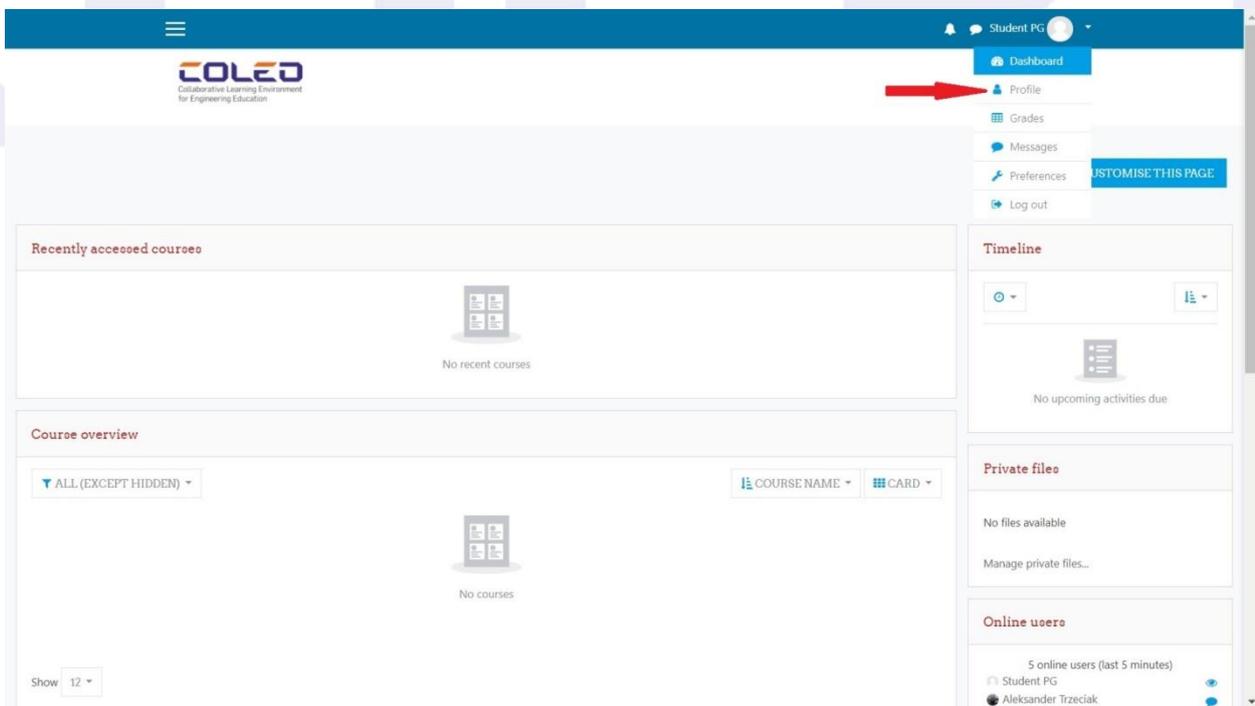
Explore your profile options and click an arrow in the right upper corner



Chose Profile option



Explore options in your profile



Explore options in your profile

The screenshot shows a user profile page for 'Student PG'. At the top, there is a navigation bar with a menu icon, a notification bell, and the user's name 'Student PG'. Below the navigation bar is the COLED logo and a sidebar menu with options: Dashboard, Profile, Grades, Messages, Preferences, and Log out. The main content area is divided into several sections:

- User details:** Includes fields for Email address (blanka@pg.gda.pl), Country (Poland), and City/town (Gdansk). There is an 'Edit profile' link.
- Miscellaneous:** Lists links for Blog entries, Forum posts, Forum discussions, and Learning plans.
- Reports:** Lists links for Browser sessions and Grades overview.
- Login activity:** Shows 'First access to site' on Wednesday, 14 October 2020, 5:49 PM (24 mins 36 secs) and 'Last access to site' on Wednesday, 14 October 2020, 6:13 PM (36 secs).
- Privacy and policies:** Includes a link for Data retention summary.

At the bottom of the page, there are two buttons: 'RESET PAGE TO DEFAULT' and 'CUSTOMISE THIS PAGE'. A URL is visible at the bottom left: <https://coled.moodle.pl/user/profile.php?id=37>.

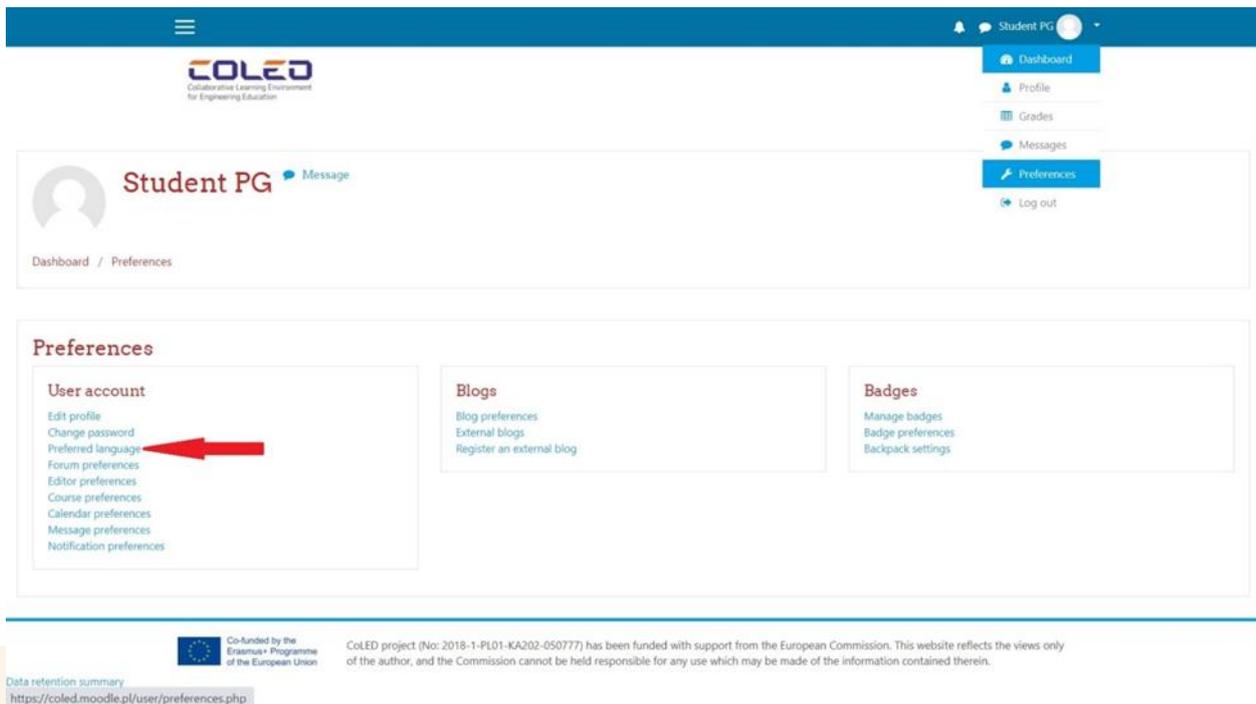
You can edit your profile e.g. add your profile picture:

The screenshot shows the 'Edit profile' page for 'Student PG'. The page is divided into several sections:

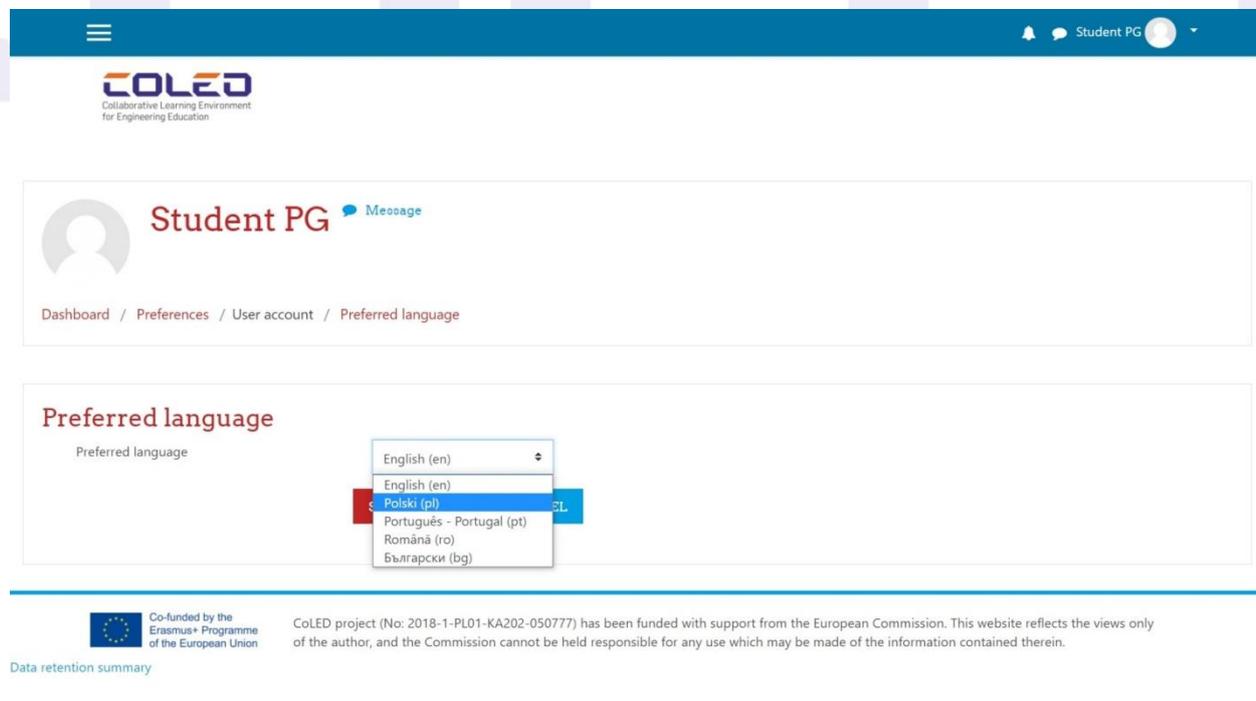
- General:** Includes fields for First name (Student), Surname (PG), Email address (blanka@pg.gda.pl), Email display (Allow only other course members to see), City/town (Gdansk), Select a country (Poland), and Timezone (Server timezone (Europe/Warsaw)).
- User picture:** Shows the current picture as 'None'. There is a 'New picture' section with a file upload area. The upload area has a text box for the file name and a 'Files' button. Below the upload area, it says 'Accepted file types: Image files used on the web (gif, jpg, png, swf, png, jpg)'. There is also a 'Picture description' field.
- Additional names, Interests, and Optional:** These sections are currently empty.

At the bottom of the page, there are two buttons: 'UPDATE PROFILE' and 'CANCEL'.

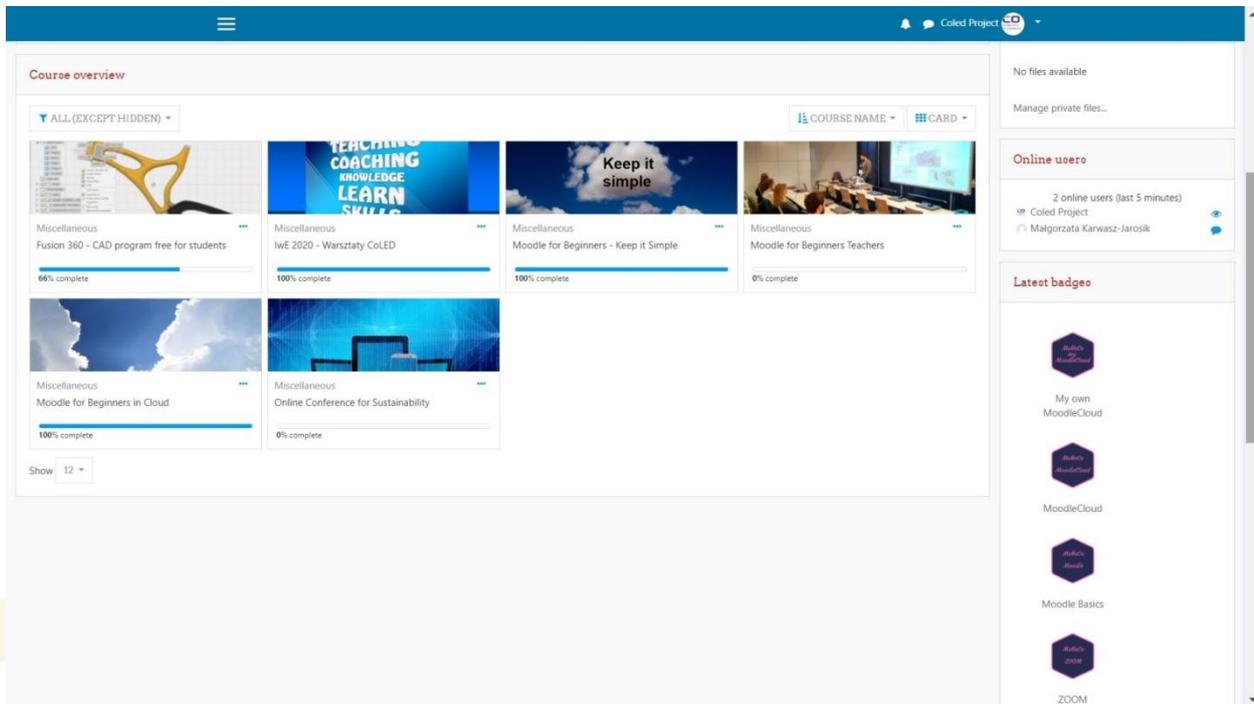
If you go to Preference, you can edit the language options:



Chose your preferable language from the list – all project languages are available including English, Polish, Romanian, Portuguese, and Bulgarian.



Monitor your progress watching blue stripes (indicators of completion) and Latest badges



If your course is completed you will get a certificate just like this one!



Thank you!

What is the CoLED training?

Structure and Content of the CoLED e-Learning Platform

The user can browse the modules in their order or can select only the desired modules that he/she can study according to his preference. Below are the main topics of each module.

CoLED-Learning Course

Module 1: Introduction to automation

Summary content:

- 1.1. The goal of automation and industrial applications
- 1.2. Automation of product manufacturing processes
- 1.3. Levels of machine automation
- 1.4. Levels of automation for machines and technological devices
- 1.5. Levels of automation for information and control flows
- 1.6. An example of determining automation levels

> Conclusion Module 1

Module 2: Needs for A&R in SME

Summary content:

- 2.1. Introduction to the issue of A&R systems implementation
- 2.2. Painting robots and welding robots
- 2.3. Dispensing/weighing systems
- 2.4. Robotized cell
- 2.5. Robotized assembly lines
- 2.6. Service of automated machines
- 2.7. Vision systems
- 2.8. Manipulators
- 2.9. Why A&R systems are need in SMEs
- 2.10. Selection of A&R system
- 2.11. Benefits for SMEs using modern A&R Systems

> Conclusion Module 2

Module 3: Automation objectives, identification of goals

Summary content:

- 3.1. Objectives of company automation - introduction
- 3.2. Determination of the company objectives
- 3.3. Mechanization, systematization and automation matrix
- 3.4. Fulfilling automation and company objectives
- 3.5. Identification of company activities that match A&R

> Conclusion Module 3

Module 4: Automation advantages and constrains

Summary content:

- 4.1. Introduction
- 4.2. A few words on automation of production processes
- 4.3. What is the automation?

- 4.4. The advantages of implementing automation
- 4.5. Basic errors during automation
- 4.6. Good practices for investing in automation
 - > Conclusion Module 4

Module 5: Cost Benefit Analysis and Return on Investment

Summary content:

- 4.7. Cost benefit analysis and ROI calculation
- 4.8. Return on investment calculation
- 4.9. Calculating costs
- 4.10. Calculating benefits
- 4.11. Cost benefit analysis
- 4.12. Example of cost benefit analysis
 - > Conclusion Module 5

Module 6: Automation Risks

Summary content:

- 6.1. Risk factors in the production company
- 6.2. Production risk
- 6.3. Ishikawa diagram for the production process
- 6.4. Elements of the risk management process
- 6.5. Risk identification
- 6.6. Risk analysis
- 6.7. Risk response planning
- 6.8. Risk monitoring and control
 - > Conclusion Module 6

Module 7: Implementation Planning

Summary content:

- 7.1. Introduction
- 7.2. Preliminary implementation plan
- 7.3. Detailed implementation plan
- 7.4. Definition of milestones
- 7.5. Identification of success indicators
- 7.6. Example
- 7.7. Important comments on selected phases of the A&R implementation process in a company
 - > Conclusion Module 7

Module 8: Sources of Financing the Automation

Summary content:

- 8.1. Financing automation
- 8.2. How new investment are financed
- 8.3. Operating lease
- 8.4. Human capital and staff training
- 8.5. European commission programmes
- 8.6. How to receive funding?
- 8.7. Programmes in Poland

- 8.8. Why is it worth
> Conclusion Module 8

Module 9: Identification of Training Needs

Summary content:

- 9.1. Training process
- 9.2. The importance of training
- 9.3. Available training options
- 9.4. Key factors
- 9.5. The most efficient training options
- 9.6. Training outside the company's seat
- 9.7. How to justify spending money on employee training?
- 9.8. Typical excuses for non-training
> Conclusion Module 9

Module 10: Indicators of Implementation, Monitoring and Evaluation

Summary content:

- 10.1. Introduction
- 10.2. Types of performance measurement
- 10.3. Key performance indicators
- 10.4. Production analysis – ways and application of indicators
- 10.5. Standard indicators in the maintenance area
- 10.6. Example
> Conclusion Module 10

Module 1: Introduction to automation

This module aims to offer a broad perspective on the concept of automation, why is so important for nowadays industry. The three parts of an automated solution are presented control done by a human, control done by automation devices and the actual manufacturing done by the machines. Further levels of automatization evidence the physical and cognitive tasks. The levels of automation for machines and technological devices present seven, distinguished levels of automation, from level 1 - handwork up to level 7 – completely automated. Also the 7 levels of automation for information and control flows are presented. For a good understanding of the theoretical concepts it is presented an example of determining automation levels that is integrating 7 work-stations. It is performed the assessment of automation levels, which visualize the division of tasks between human and automation

Module 2: Needs for A&R in SME

The module presents and exemplifies the usefulness of the automation process in production through the different classes of robots that are used. Then, the painting and welding robots are detailed together with their current applications. Other applications presented are dispensing / weighing systems for packaging and unpacking products, dosing and sorting, robotic cells with a multitude of technical possibilities, robotized assembly lines, service of automated machines, vision systems, manipulators. The usefulness of A&R in SMEs is argued from the perspective of economic efficiency, quality increase and productivity, job security. The selection criteria of the A&R systems are also presented.

Module 3: Automation objectives, identification of goals

This section shortly introduces automation objectives and identifies the goals that can convince the manufacturer to go in that direction. The three key categories of objectives are evidenced: market related objectives, internal company objectives, process related objectives. Starting from the mechanization classes and systemization levels the automation matrix is defined. The main requirements for a simplification and good organization of the manufacturing process are evidenced as well as the necessity that introduction of automation in company to be supported by Total Quality Control. Successful implementation of A&R in a company depends on rules that identify company's activities that match A&R, like superiority, simplify manufacturing, evolve from and coexisting with manual techniques

Module 4: Automation advantages and constrains

This unit describes the advantages and limitations of industrial automation. It starts with presentation of automation and production processes, industrial automation definition. Automation and robotisation of production processes becomes the norm in plants and factories and have serious advantages, which prove the benefits of implementing these solutions: improving the process, optimisation of costs, increasing production capacity. To successfully implement automation the company management must understand what the usual errors are during this process and how to avoid them: no clear business purpose, no technical business analysis before the investment, allocating too little time for bench tests, no machine scalability, assumption of unattended stand, continuing ROI and R&D investment. Good practices for investing in automation are highlighted.

Module 5: Cost Benefit Analysis and Return on Investment

The main aim of this unit is to show how to evaluate the efficiency of an investment project and to choose the most profitable option. It is presented the popular economic calculation - Return on Investment (ROI) which highlights the direct gains or financial benefits that can be obtained from a project in relation to the implementation costs of the project or solution concerned. It explains how to calculate costs and benefits. Then more detailed economic information is presented, the cost-benefit analysis which quantifies both categories of costs and benefits: tangible and intangible. The major types of cost - benefit analysis are evidenced: ex ante and ex post. A practical example of Cost Benefit Analysis for acquisition of a robotized cell which replaces manual work of 4 workers gives a good idea how to employ the method in industrial practice.

Module 6: Automation Risks

There are risks involved with anything that's automated in manufacturing. Risk can increase where machines and workers co-exist, and facility managers need to be aware of these risks and think about safeguards to protect employees. It is evidenced several large risk groups: organizational, production, economic, technological. The production risk is analyzed together with Ishikawa diagram for the production process. Then the risk management process as one of the most important elements of strategic management is presented, and its four stages: risk identification, risk analysis, risk response planning, risk monitoring and control. Performing the proper risk assessments will ensure that all necessary steps including the right approach to education and training are being taken to successfully introduce and use automation to the company daily operations.

Module 7: Implementation Planning

This unit is an introduction to the Implementation Planning of an automation and robotics solution in the plant that aims to identify the main steps to be taken to ensure the endowment of the factory with new equipment aimed at increasing manufacturing productivity while ensuring the continuity of current manufacturing processes, avoiding accidental shutdowns during testing and implementation. It includes the term of investment realization, expected efforts, divisions or corporate services and personnel to be responsible for the system implementation on the part of the company. It is evidenced milestones of implementation in the planned time and success indicators of A&R system implementation which provide generalized information on the realization of milestones. A sample of a preliminary implementation plan of a robotized system realized by an external company and important comments on selected phases of the A&R implementation process give a good idea how to employ the method in industrial practice.

Module 8: Sources of Financing the Automation

Automation is not always easy - especially in small and medium-sized enterprises, where financial issues may hinder or slow down its implementation. The automation and robotisation of production lines is a relatively costly process that is specific to small and medium-sized enterprises and, although it brings measurable benefits, it is, as with any investment, deferred over time. In this unit the mechanism of financing new investments is presented, than the operating leasing the most common form of external purchase financing for industry is exemplified. Human capital and staff training is a requirement to provide the machines with professional service. Than different approaches to financing automation are presented, which often allow a company to reduce the risk of investment and to implement automation into its key processes overnight, sometimes even without initial investment. European Regional Development Fund and European Social Fund are European Commission programs which have available funds for such investments. Also the available programmes in Poland are presented.

Module 9: Identification of Training Needs

The main aim of this unit is to show why training is essential for the smooth operation and development of production companies. It is highlighted the importance of training people in a company which brings enormous benefits to the entire organization. Successful companies always provide their employees with comprehensive and continuous training. The available training options are presented: printed materials, video training, seminars, interactive/remote training, process simulation software, on-the-job training. The 6 critical factors that may affect the implementation of the training process in a company are presented: relevant, interesting, interactive, adaptable, skill development, and monitoring progress. Then training outside the company's seat is analysed and justification for spending money on employee training. Finally typical excuses for non-training are revealed.

Module 10: Indicators of Implementation, Monitoring and Evaluation

This unit is an introduction to the indicators of implementation, monitoring and evaluation of production systems. The 3 types of performance measurement are presented:

- *Determining the effectiveness of the activity and internal and external comparisons;*
- *Analysis of the problem to identify its causes;*
- *Measurement of effectiveness of implemented improvement actions.*

The key performance indicators which illustrate a selected area of company's activity or to assess its effectiveness from a certain point of view, are exemplified through Overall Equipment Effectiveness, which is calculated as a product of Availability, Efficiency and Quality.

Then the production analysis is presented as a way and application of indicators, and the Production Efficiency Indicators which allow identifying problems that may occur in the production process. Standard indicators in the maintenance area evidence the typical indicators in Maintenance. An example of for OEE calculation for a production data system facilitates a good understanding of knowledge.

What training methodology is applied?

The COLED e-Learning courses are developed as the result of a training methodology which focus on a distance learning (self-paced, e-learning and elements of gamification) and takes into account specific needs of the target groups identified. It takes into account the **principles of the adult education**, bearing in mind the promotion of problem-solving, auto-reflection and analysis of the professional practice.

The **e-learning principles as a way to impart the training** are:

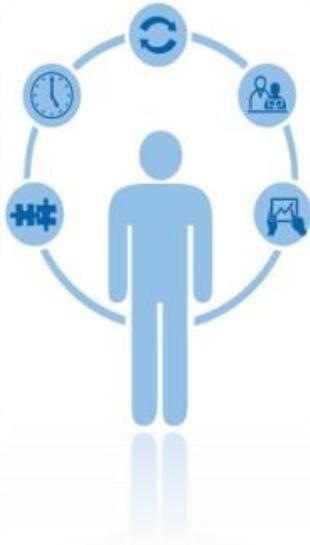
1. Based on the constructivism

Instead of a reception-memorization process of the information it is promoted an active learning process. **The virtual learning environment works as a guide**, facilitating information, promoting the curiosity and motivation of the learner for continuing discovering, and identifying what may be useful for his/her professional practice.



2. Adult education's principles

- *Previous experience as a learning resource:* adults need to create knowledge throughout previous experiences, which makes the new information coherent to the knowledge they already have.
- *Autonomy and auto-directed learning:* to give learners some liberty to select what they consider being the most significant in each case.
- *Interests and Motivation:* adults know their interests and will get motivated by that, which will help in their professional practice or that is relevant for their professional development
- *Facilitating learning environment:* it is important to create an environment that facilitates comfort and promotes a clear and rapid access to the information, as well as interaction and participation.
- *Different learning styles:* Adults have strong personal learning styles that would determinate the way in which the acquisition of new concepts would be carried out.



- *Using the participants' previous experience as a tool for the learning process, giving the learner the liberty of choosing the most relevant information.*
- *The information is facilitated by the platform, which works as a guide, so the learners may self-direct their learning process, focusing on the most relevant aspects for their business implementation.*
- *The development of the course is focused on the characteristics and needs of the target groups, being designed based on the future participants' interests and motivations.*
- *The design of the platform is attractive, accessible, and easy to use which facilitates the interaction between the participants.*
- *The different learning styles are taken into account by the learning platform and the content of the course, in order to make all the learners feel comfortable in their own learning process.*



3. e-Learning principles

The used methodology is based on the adaptation of the format and of the content to the specific characteristics of the learning process. In this way the access to the information is enabled and the digital tool is used as a resource for adapting the contents and procedures to the participants' learning styles.

4. Individual learning pathway

Beside the mandatory theory, the learner can also gather knowledge by reading literature, watching documentaries, attending events and fairs related to the topics of the training or interviewing people in their own surroundings.



5. Peer-to-peer learning

Collaborative learning may emerge as a result of idea exchange that benefits the whole. The peer group should go along with the development of the whole process through formal and/or informal contacts where appropriate and using a variety of media, such as: e-mail, forum, chats, and video-conferencing.

6. Tutoring

During the work on the module's content the learners will be supported by their tutor, that should advise learners on the best ways of using the module materials; the tutor should also adapt the content to the individual needs of the learner and prepare extra material when necessary (e.g., provide more difficult tasks, help in solving them, guide learner in taking alternative routes through the material, adapt the package to local circumstances, etc.).

➤ **Online contact**

Learner can ask questions whenever they are stuck with the theory or an assignment. These questions are answered by the tutor or peer learners and can be accessed at any time. The answers will help them complete or understand different parts of the content.

➤ **Suggestions for improvement**

When a learner delivers a product, he or she will be given feedback on the work developed and suggestions for improvement by the tutor.

Who will benefit from the CoLED learning course?

All levels of SMEs are going to benefit from the CoLED training course.

Manufacturing SME managers need to know about industrial automation in the manufacturing activities and practices that can be applied to their companies to develop competitive on the global market. Acquiring skills and knowledge in industrial automation can be the key to the success of an industrial business. This can be achieved in many efficient ways, including collaborative learning with the support of the CoLED e-learning platform.

Upgrading to industrial automation in the manufacturing activities and practices: its Benefits and Opportunities

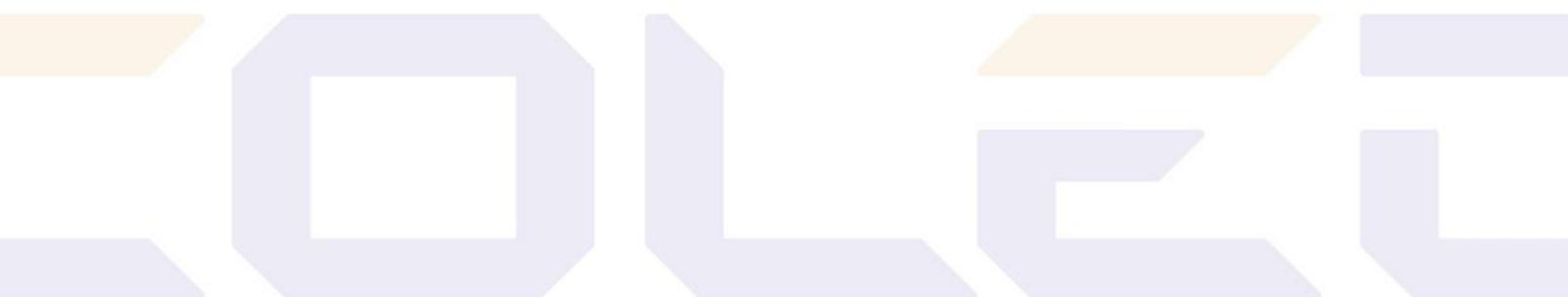
- Increased productivity
- Increased efficiency
- Short execution time
- Very high workload
- Simplification of the activity
- Increased safety and protection of employees
- Accurately performed work
- Better quality products
- Considerable reduction in the number of scraps
- Increased reliability
- Better paid jobs

Areas of applicability

- **Metal processing industry**
This activity is characterized by a rather dangerous working environment and conditions for human personnel, as well as the use of materials of very large dimensions and densities. The very high temperatures used to process these metals, as well as their casting require special and automated equipment.
- **Machine building industry**
Starting from the first assembly line, created and implemented by Henry Ford, the car manufacturing industry has pushed a lot the technology and the mechanism through which today's activities know a much higher efficiency and performance. Mass production of different parts and components, at the same size and characteristics, is just the merit of the automation process.
- A lot more areas of industry can apply automation: **Food industry, Textiles industry, Pharmaceutical Industry, etc.**

Benefits of the training using CoLED e-learning platform

Benefits for the learner:	Benefits for the employer:
<ul style="list-style-type: none"> • Easier finding the learning contents to cover learning needs • Improve qualifications in solutions for automation and robotics in manufacturing sector • Greater chance to ensure the successful realization on the labour market • Reduction of the gap between the individual skills and the skills required by the labour market • Increased employment opportunities 	<ul style="list-style-type: none"> • Facilitation of the training process for companies with limited human and financial resources • Meets skills shortages • Can lead to an improved workforce performance and productivity • Increases employee motivation – higher staff retention • Collaborative learning - • Little time off the job, minimal disruption.



How can the CoLED course be employed to the best advantage of its users?

Due to its flexibility, the CoLED training platform allows a customized adaptation of learning tools to the specific needs of each user who can follow the desired training path.

Keep in mind:

Once connected to the platform, you can study any of the available CoLED modules, you can download them in pdf format, you can study them individually or you can use them for teaching purposes. You have a theoretical part, examples that will help you understand the theoretical part, video, questions and bibliography to deepen the study.

Recommendation: Start the study with module 1 and go through them in order

It is important to know that, even if an e-learning platform has many advantages regarding quick access to content, there are also disadvantages such as lack of interaction, which must be realized and solved.

For these reasons it is good to resort to blended learning, by combining online training sessions with face-to-face ones, in which you need an instructor to guide and assist you, to talk with peers, who can be more experiment and in this way you can clarify some notions

There are several reasons that may lead to the choice of a collaborative learning environment:

- It has a positive impact on employers and the company
- Increases problem-solving ability
- Increases the team's confidence through improvement
- It is created opportunities for lifelong learning partnerships
- It improves the company's reputation

When opting for collaborative learning through the CoLED platform, it is recommended that the enterprise manager customize and adapt the learning tools to the specific profile and needs of the enterprise.

First, the enterprise manager should go through all the modules available in the platform, after which he should select the ones that best suit the training interests of the enterprise.

But here are some questions that the trainer/teacher needs to ask:

- What technologies and expertise are currently used in manufacturing processes?
- What technologies require automation and robotisation?
- What automation technology could be developed to increase the company's competitiveness?

- What skills do you need to develop to improve the efficiency of automated operations?

By answering these questions, the enterprise manager can identify potential weaknesses or delays related to the company's specific productivity growth goals through automation processes. With this support, the top management of the company can establish the most recommended investments to be made in modernized and automated equipment.

Although the investment in infrastructure is absolutely necessary, but we must still note that, now in the era of information technology, the most profitable investments are in initial training, continuous training and improvement of human resources involved in the production process.

A preliminary review of all study modules is required not only by business managers, but also by VET teachers who use the CoLED platform in training. The latter have to go through the whole CoLED course, but in a slightly different approach: they have to identify the topics that are part of the student training program and focus on these contents.

VET teachers must first become familiar with the functionalities of the platform, in order to be able to select the best methods of interaction with students.

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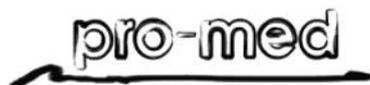
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CoLED project (No: 2018-1-PL01-KA202-050777) has been funded with support from the European Commission. This document reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.