GREEN AND DIGITAL SKILLS DEVELOPMENT FOR EUROPEAN ENGINEERING PHD CANDIDATES

TEACHING GUIDE FOR MOOCS DEVELOPED

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1. INTRODUCTION

The TECSKILL project is an international collaboration initiative between four European universities: the University of Évora (Portugal), the University of Extremadura (Spain), Högskolan i Gävle (Sweden), and the University of Parma (Italy). TECSKILL promotes international and innovative training experiences through workshops, talks, and social events. As part of this project, a series of MOOCs (Massive Open Online Courses) have been developed that address both the digitization of processes and sustainability and research project management. This teaching guide explains the teaching process that doctoral students will follow, describes the content structure, and details the objectives of each course.

The MOOCs have been grouped into three courses, given their thematic diversity:

1. **MOOC on sustainable research projects.** Provides basic methodologies for planning and structuring a research project with sustainability criteria. Includes content on problem definition, indicators, ethics, communication, and workflow.
2. **MOOC on green skills.** Introduces fundamental concepts of environmental sustainability. Covers topics such as the circular economy, life cycle analysis, material selection, and eco-design of products and processes.
3. **MOOC on digital skills.** Provides essential digital tools for research. Includes microcontroller programming, data acquisition, automation, digital modeling, and basic machine learning techniques.

This classification allows for the creation of a coherent training program that integrates sustainability, technical skills, and digitization. Doctoral students thus develop cross-cutting skills—such as project planning and the use of digital tools—and specific skills related to environmental impact and technological innovation.

The guide provides an overview of the three MOOCs, their content, and their objectives. It also provides guidance for students and tutors to facilitate learning monitoring and ensure consistency with the objectives of the doctoral program.

2. REPORT OBJECTIVES

The overall objective of this guide is to establish a teaching guide that organizes and facilitates doctoral students' learning in the three MOOCs, integrating content, methods, and monitoring criteria for the development of green, digital, and sustainable research skills.

The specific objectives are listed below:

- Define a common pedagogical framework that allows students to plan their learning, understand the structure of the MOOCs, and know the training expectations associated with each one.
- Specify the content of each MOOC, as well as the proposed learning methods and the expected timing for the acquisition of each skill.
- Organize the MOOCs into three training blocks (Green, Digital, and Sustainable Research Projects), ensuring a logical educational progression from basic knowledge to its application in real proProporcionar una herramienta útil para docentes y tutores, que facilite el seguimiento del progreso del estudiantado y la evaluación de su proceso formativo.
- Promote active, autonomous, and research-oriented learning, aligned with the objectives of the doctoral program and focused on strengthening analytical, innovative, and sustainability skills.
- Encourage interaction between students and the academic community, promoting the exchange of best practices, interdisciplinary collaboration, and the creation of networks for future research projects.

3. CLASSIFICATION OF MOOCS.

This section provides an overview of the three MOOCs that make up the training program. Each course addresses a specific area of competence and is structured around a set of lessons designed to guide students progressively through the material. Table 3.1 compares the three MOOCs in the training program, showing their total number of lessons, the number of sessions into which these are divided, and their main objective.

Table 3.1. Summary table of MOOCs taught

MOOC	Nº lessons	Nºsesiones	Main objective
First steps to develop a sustainable research project	13	13	Develop proposals for sustainable research projects.
Green competences development	7	26	Develop skills to minimize the environmental impact of research projects and apply sustainability principles in product and process design.
Digital competences development	10	30	Provide students with digital tools for data capture, simulation, model development, and process automation.

It can be seen that the number of sessions in the MOOCs “Green competences development” and “Digital competences development” is greater than the number of lessons because each lesson has been broken down into smaller, more manageable units. This pedagogical strategy aims to facilitate autonomous learning, allow students to progress at their own pace, and ensure better assimilation of more technical content. Thus, although a lesson constitutes a complete thematic unit, its associated sessions break down explanations, practical examples, and activities, making them more accessible and easier to follow.

4. MOOC 1: FIRST STEPS TO DEVELOP A SUSTAINABLE RESEARCH PROJECT

This course guides students in creating a sustainable research project. Its thirteen videos progressively present the fundamental components of a responsible project.

The objectives of this MOOC are listed below:

1. Train students to design a sustainable research project, from the formulation of the initial idea to the development of a complete and structured proposal, aligned with good scientific practices and environmental sustainability criteria.
2. Provide methodological and planning tools, including definition of objectives, scope, work breakdown structure (WBS), timelines, research methodologies, risk analysis, and mitigation strategies, to ensure that the project is viable, coherent, and executable.
3. Develop skills in identifying and analyzing funding calls, enabling students to recognize regional, national, and European opportunities, compare requirements, and adapt their project to different funding frameworks.
4. Strengthen project management and collaborative work skills, from internal team organization to participation in consortia, integrating roles, responsibilities, effective communication, and sustainability criteria in all phases of the project.

These objectives will be achieved through the following content:

- Basic concepts of research projects: nature, purpose, and their relevance in an academic career.
- Search and classification of calls for proposals: analysis of territorial levels, types of funding, and preparation of comparisons.
- Definition of the research idea: construction of the title, alignment with the Sustainable Development Goals, and analysis of sustainable impact.
- Justification of the project (the *why*): development of the scientific context, identification of the problem, review of the state of the art, and definition of the novel contribution.
- Formulation of objectives (the *what* and *for what*): distinction between the general objective and specific objectives, and prioritization using matrices such as MoSCoW.
- Work planning: scope design, project structure using a WBS, preparation of the WBS dictionary, and general timeline.
- Research methodology: definition of the methodological design, data collection and analysis techniques, methodological flowchart, and ethical considerations.
- Integration of sustainability: measures to reduce environmental impacts in project activities, prototypes, travel, materials, and processes.

- Risk management: identification, qualitative and quantitative assessment, probability/impact matrices, and response strategies.
- Advanced R&D project management: types of calls, TRL levels, consortium organization, roles, communication channels, and responsibility matrices (RACI).
- Team management: roles within a research group, hierarchies, competence levels, and task assignment tools (IU matrix).

To ensure solid and meaningful learning, the content will be delivered through YouTube videos. Each lesson presents theoretical concepts and practical examples. It is recommended to complement the theory with simple exercises (for example, developing a sustainable project outline or defining sustainability indicators) and to share questions with other students in study groups.

The content is progressively acquired throughout the thirteen lessons. At the end of the MOOC, students will be able to design a research project aligned with sustainability criteria. The lessons are distributed over 4 weeks, as shown in Table 4.1

Table 4.1 Cronograme of MOOC 1

Week	Lessons	Estimated hours
Week 1	Lesson 1; Lesson 2; Lesson 3.	≈ 4.5 h
Week 2	Lesson 4; Lesson 5; Lesson 6.	≈ 4.5 h
Week 3	Lesson 7; Lesson 8; Lesson 9.	≈ 4.5 h
Week 4	Lesson 10; Lesson 11; Lesson 12; Lesson 13	≈ 6 h

4.1. Lessons of MOOC 1

In this section, the 13 lessons delivered in this MOOC are summarized.

Lesson 1. The first lesson presents the general purpose of the course: learning how to design a sustainable research project from its conception to the preparation of a complete proposal. It explains the elements that a project must include (summary, context, objectives, methodology, timeline, resources, and results) and why these are essential for obtaining funding. It also highlights the importance of integrating sustainability criteria into all phases of the research. The lesson introduces the tools and templates that will accompany the student throughout the course. Finally, it positions the MOOC as practical training for preparing future competitive proposals.

Lesson 2. This lesson teaches how to identify funding opportunities at different levels: regional, national, and European. Students are asked to gather several calls for proposals at each level and compare them using tables that include key information such as available budget, opening dates, sustainability criteria, types of projects funded, and administrative requirements. The objective is for students to understand which calls best fit their profile and research idea. It also suggests creating an annual calendar of calls to plan future submissions. The lesson emphasizes that thoroughly understanding the funding landscape is a fundamental step toward a sustainable research career.

Lesson 3. This lesson explains how to transform a scientific or social concern into a clear, relevant, and sustainable research idea. It describes the need to link the idea to an environmental, social, or economic challenge, and presents an example in the field of renewable energy. It then covers the criteria for writing an effective title: concise, informative, free of unnecessary symbols, and aligned with the project's theme. Students are encouraged to generate several options and select the one that best synthesizes the study's purpose. The lesson concludes by inviting the student to formulate their own idea and title.

Lesson 4. This lesson delves into the project justification, one of the most important sections of any proposal. It explains how to write the problem motivating the research, how to present the state of the art, and how to argue the novel contribution. It highlights the importance of identifying unresolved knowledge gaps to demonstrate the relevance of the project. A case related to energy and thermal efficiency is used as an example. Students are guided to develop their own justification section following three steps: context, gap, and contribution.

Lesson 5. This lesson deals with the formulation of objectives, distinguishing the general objective from the more concrete and measurable specific objectives. An example based on thermal storage technologies is used to illustrate how they should be written. The MoSCoW matrix is also introduced as a tool for prioritizing objectives based on importance and feasibility. This matrix helps differentiate what is essential, desirable, optional, and out of scope. Finally, students are invited to organize and review their own objectives.

Lesson 6. The lesson defines the scope as the delimited set of tasks required to achieve the project's objectives. It explains that the scope serves as a bridge between objectives, resources, expected results, and the timeline. It also emphasizes that this section includes both the work plan and the methodology to be applied. The importance of specifying what is included and excluded from the project is stressed to avoid deviations during implementation. A well-defined scope facilitates team coordination and progress monitoring.

Lesson 7. This lesson introduces the WBS (Work Breakdown Structure), a key tool for logically and hierarchically structuring the work. It explains how to divide the project into phases, work packages, and increasingly detailed tasks until reaching activities that can be clearly assigned to people, timeframes, and resources. An example consisting of six phases is presented to illustrate the typical progression of a research project. It is also noted that a good WBS avoids duplication and facilitates timeline management. Students are invited to create their own breakdown.

Lesson 8. This lesson complements the previous one by presenting the WBS dictionary, a document that describes each work package in detail. It explains that it should include specific activities, responsible persons, assigned resources, estimated deadlines, and expected deliverables. The lesson highlights that this level of detail facilitates project monitoring and improves team coordination. A sample format is provided that students can adapt to their proposal. Finally, students are invited to transform their general WBS into a complete action plan using this dictionary.

Lesson 9. This lesson focuses on defining the research methodology, explaining the different possible designs (experimental, descriptive, qualitative, quantitative, or mixed). It also details the importance of defining population, sample, data collection techniques, and data analysis methods, whether statistical or qualitative. Ethical aspects such as informed consent and confidentiality are addressed. Examples of methodological flowcharts are presented to facilitate understanding of the process. The lesson concludes by encouraging the student to create a diagram representing their own methodological approach.

Lesson 10. This lesson guides students to review the work plan and methodology to identify activities with significant environmental impact. Examples of measures to reduce such impact are provided, such as prioritizing local suppliers, minimizing travel, optimizing energy consumption, and applying eco-design criteria to prototypes. The lesson emphasizes that small accumulated improvements contribute to much more responsible research. Students are also invited to reflect on the efficient use of materials, energy, and resources during the project. Ultimately, the goal is to integrate sustainability as a cross-cutting axis of scientific work.

Lesson 11. This lesson introduces the concept of risk as any uncertain event that may positively or negatively affect the project. It explains the importance of identifying risks in advance to plan appropriate responses and ensure continuity of the work. It presents the notion of criticality, obtained by multiplying probability and impact. Examples of common research risks are provided, such as lack of equipment, loss of key personnel, or unexpected cost increases. Students are then asked to prepare their first list of risks.

Lesson 12. Building on the previous lesson, this session explains how to assess each risk using the probability–impact matrix to classify them as controlled, moderate, disruptive, severe, or critical. Four response strategies are described: avoid, transfer, mitigate, and accept, with examples of when to apply each. The lesson emphasizes that risk management involves additional costs that must be incorporated into the budget. It also highlights the need to update risks throughout the project, as their criticality may change, as occurred during the pandemic. The lesson concludes by inviting students to define an appropriate strategy for each identified risk.

Lesson 13. This lesson addresses key concepts in advanced R&D project management, particularly useful for sustainable and digital initiatives. It explains why researchers must understand the project life cycle—from planning to execution and closure—and details the different types of calls (top-down and bottom-up) and their practical implications. It also classifies projects according to their purpose (R&D&I, proof of concept, career development, networks, infrastructures, and strategic programs). The lesson explores how consortium projects work, describing roles, management layers, and communication structures needed to coordinate multiple organizations.

5. MOOC 2: GREEN COMPETENCES DEVELOPMENT

The second course is dedicated to the development of green skills applicable to research projects. Each lesson includes an introductory video (available on the platform) and another video with the full course content.

The objectives of this MOOC are the following:

1. Train students in selecting materials and processes that minimize environmental impact.
2. Provide recycling and circular economy tools applicable to research contexts.
3. Show how eco-design and digital control can improve the sustainability and competitiveness of prototypes and patents.

These objectives will be achieved through the following content:

- Optimal selection of materials based on sustainability criteria
- Recycling and reuse strategies in laboratories
- Life cycle assessment to measure environmental impact
- Digital control principles to optimize resources
- Circular economy to minimize waste
- Eco-design of sustainable prototypes and patents

To ensure solid and meaningful learning, the content will be studied through an introductory video and a full video. Students should first watch the introduction to become familiar with the concept and then deepen their understanding with the longer video. Case studies are recommended (for example, comparing different materials using environmental impact tables or designing a recycling plan for a laboratory), as well as using spreadsheets or life cycle analysis tools to apply the knowledge.

The content is progressively acquired throughout the seven lessons. After completing all the lessons in this MOOC, students will have developed skills to reduce the environmental impact of their projects. The lessons are distributed over 3 weeks, as shown in Table 5.1.

Table 5.1 Cronograme of MOOC 2

Week	Lessons	Estimated hours
Week 1	Lesson 1; Lesson 2	≈ 3 h
Week 2	Lesson 3; Lesson 4; Lesson 5	≈ 4.5 h
Week 3	Lesson 6; Lesson 7	≈ 3 h

5.1. LESSONS OF MOOC 2

In this section, the 7 lessons delivered in this MOOC are summarized.

Lesson 1. Sustainability criteria for selecting materials and products are studied, analyzing their availability, recyclability, and environmental impact. Students also acquire criteria for comparing alternatives and making informed decisions—for example, evaluating different materials based on their life cycle, ecological cost, and potential for reuse.

Lesson 2. This lesson presents methodologies to reduce waste and reuse materials in laboratories and scientific projects. Good practices for waste management are analyzed, as well as the design of experiments that minimize waste and strategies that integrate reuse and recycling into the operational phase of the project.

Lesson 3. The lesson introduces Life Cycle Assessment as a tool to evaluate the global impact of a product or process. Sustainability metrics are discussed, and practical examples of application in research environments are presented to raise student awareness of the importance of comprehensive and quantifiable evaluation.

Lesson 4. This lesson explains how to apply digital control methodologies to optimize processes and reduce energy consumption. It is complemented by videos covering algorithms and advanced control techniques, including system automation, consumption monitoring, and the application of digital technologies to improve the efficiency and sustainability of experimental processes.

Lesson 5. This lesson addresses the role of sustainability in the planning and execution of experimental processes, focusing on how to reduce unnecessary consumption, optimize resource use, and apply energy-efficiency principles in research environments. It introduces specific practices such as responsible preparation of reagents, rational use of laboratory equipment, efficient organization of experimental phases to minimize travel and consumption, and the selection of less polluting alternatives when working with reagents or materials. It also highlights the importance of documenting potential impacts and applying preventive strategies to reduce them from the methodological design stage.

Lesson 6. This lesson describes the transition from the linear to the circular model, presenting strategies to reuse and extend the lifespan of materials and products used in research. It explores how to incorporate closed-loop logic into resource selection, experiment planning, and waste management. Real cases are presented in which circular economy approaches have reduced material and energy costs, improved efficiency, and generated innovative solutions in scientific projects. Students are encouraged to explore new ways of redesigning research processes to avoid continuous resource extraction and promote systematic reuse.

Lesson 7. This lesson teaches students to integrate eco-design criteria into prototype development, applying sustainability principles at every stage of technical development. It covers the selection of eco-friendly materials, the analysis of environmental regulations affecting design protection, and the creation of prototypes designed to last, be repaired, or be recycled. The lesson also examines how sustainable patents are managed, including the registration of low-impact designs, the use of alternative materials, and best practices for documenting added environmental value. Practical examples are provided to illustrate how researchers have transformed traditional prototypes into optimized and sustainable versions.

4. MOOC 3: DIGITAL COMPETENCES

The third MOOC addresses the digital skills needed to digitize research processes, automate systems, and manage data. The lessons are supported by explanatory videos and tutorials.

The objectives of this MOOC are listed below:

1. Familiarize students with low-cost hardware and software for prototyping and data capture.
2. Train them in techniques related to artificial intelligence, modeling, and process automation.
3. Raise awareness about intellectual property and the importance of protecting and valorizing research results.

These objectives will be achieved through the following content:

- Machine learning applied to nonlinear systems
- Use of low-cost microcontrollers, sensors, and actuators
- Industrial property and change management
- Arduino programming for measurement and problem-solving
- Intelligent data acquisition and calibration
- Automation through models, algorithms, and PLCs
- Creation of digital models to simulate and predict behaviors
- Virtual instrumentation with LabView
- Advanced development of models and algorithms
- Final workshop on intellectual protection and self-assessment

Learning these topics is predominantly practical. After each theoretical explanation, students are encouraged to install and configure microcontrollers, develop small programs in Arduino or LabView, and implement machine learning models using available datasets. They must also consult technical documentation to understand industrial property and create a protection plan for their prototypes. The lessons are complemented with readings and guided examples.

Mastery of these skills requires continuous practice. Upon completing this course, participants will be able to digitize research processes. The lessons are distributed over 3 weeks, as shown in Table 5.1.

Table 4.1 Cronograme of MOOC 3

Week	lessons	Estimated hours
Week 1	Lesson 1; Lesson 2; Lesson 3	≈ 7 h
Week 2	Lesson 4; Lesson 5; Lesson 6	≈ 7 h
Week 3	Lesson 7; Lesson 8	≈ 5 h
Week 4	Lesson 9; Lesson 10	≈ 5 h

4.1. Lessons of MOOC 3

In this section, the 10 lessons delivered in this MOOC are summarized.

Lesson 1. This lesson introduces the fundamentals of machine learning applied to the digitalization of nonlinear systems. It explains essential concepts such as datasets, training, validation, and prediction, showing how machine learning models can learn complex patterns that are not evident through traditional methods. Examples are also provided in engineering, renewable energy, bioprocesses, and other fields where system behavior depends on multiple interrelated variables. The objective is for students to understand how models are designed, trained, and evaluated to accurately predict dynamic responses.

Lesson 2. This lesson explores the use of low-cost microcontrollers, sensors, and actuators for rapid development of functional prototypes. Platforms such as Arduino, ESP32, and Raspberry Pi are introduced, highlighting their versatility, low cost, and wide availability of modules. The lesson explains how to integrate sensors to acquire physical data, actuators to interact with the environment, and how to validate concepts using simple prototypes before developing more advanced versions. Basic principles of connectivity, digital communication, and interfaces—essential for modern scientific experimentation—are also discussed.

Lesson 3. This lesson addresses industrial property in scientific research, explaining the steps required to protect results through patents, utility models, or industrial designs. Key concepts such as novelty, inventive step, and industrial applicability are presented, along with patentability criteria and common risks that may invalidate protection. The lesson also introduces change management within research projects, showing how new technologies can transform processes and how to strategically manage the adaptation of teams, infrastructures, and methodologies.

Lesson 4. This lesson presents the Arduino platform as an accessible tool for data capture and solving experimental problems. It introduces connecting and programming sensors to measure variables such as temperature, humidity, acceleration, or light intensity, as well as basic debugging and visualization tools. Students learn to design small systems that acquire data in real time, integrating programming with electronics in a simple way to optimize processes, validate hypotheses, or automate repetitive tasks in scientific environments.

Lesson 5. This lesson explains data acquisition techniques and sensor calibration to improve measurement accuracy in research projects. Concepts such as noise, sensitivity, drift, dynamic range, and sampling frequency are analyzed, along with methods for filtering signals and ensuring reliable measurements. The lesson shows how to calibrate sensors by comparing their readings with reference standards, correcting systematic errors, and documenting procedures to ensure traceability. Principles of intelligent acquisition are also introduced, integrating algorithms that improve data quality automatically.

Lesson 6. This lesson details the development of automated solutions through modeling, algorithms, and programming in programmable logic controllers (PLCs). It covers the foundations of industrial automation, from process analysis to programming routines in typical languages such as ladder logic, structured text, or function block diagrams. Examples are included of automated systems that regulate industrial, experimental, or energy processes, as well as the integration of sensors, actuators, and predictive models to improve control efficiency and precision.

Lesson 7. This lesson teaches how to build digital models that simulate and predict the behavior of research systems. Different types of models are explained, along with guidance on choosing the most suitable one for a given problem. Students also learn how to validate a model, interpret simulated results, and use predictions to optimize experimental designs, identify potential failures, or reduce the number of necessary tests. The lesson emphasizes simulation as a tool to accelerate scientific innovation.

Lesson 8. This lesson introduces virtual instrumentation using NI-LabView, explaining how to design visual interfaces that control devices, acquire data, and process signals without needing to develop software from scratch. Graphical programming blocks, front panel design, and integration with sensors, cameras, laboratory instruments, and DAQ boards are presented. Typical applications such as automated test benches, remote measurement, and real-time control are explored, showcasing LabView’s potential for creating custom research solutions.

Lesson 9. This lesson delves into the advanced development of models and algorithms and their implementation in PLCs for complex processes. It analyzes advanced control strategies, early fault detection, intelligent supervision systems, and the integration of optimized algorithms into industrial architectures. The lesson also covers synchronization of multiple automated processes, energy optimization, and continuous improvement through feedback and automatic parameter adjustment. It is aimed at students who already master basic programming and wish to apply advanced techniques.

Lesson 10. The course concludes with a practical workshop on intellectual and industrial protection and a self-assessment of the digital skills acquired. Students learn how to document an innovation, prepare a patent report, identify elements that can be protected, and avoid common mistakes before disclosing scientific advances. The lesson also includes a final reflection for students to evaluate their progress, identify areas for improvement, and consolidate the digital skills developed throughout the MOOC.

6. TEACHING METHODOLOGY AND LEARNING PROCESS

The MOOCs are designed to allow flexible and autonomous progression, but there are guidelines that help ensure optimal use of the content. Below is an expanded description of the learning process:

Personal planning and organization. Before starting a MOOC, it is advisable to review the list of lessons. It is also useful to read the descriptions of the videos and set up a study schedule. Dividing the workload into several weekly sessions helps maintain a steady pace and prevents accumulation.

Active engagement when watching content. During the videos, it is recommended to take notes. Identifying key concepts facilitates understanding. It may also be useful to record questions and pause the video to review. Techniques such as concept maps or short summaries improve retention.

Practice, experimentation, and application. After each lesson, it is beneficial to apply what has been learned. Reproducing exercises from the video reinforces learning. Students may use their own data, laboratory equipment, or simulations.

Interconnection of competencies. The three MOOCs are related. It is advisable to combine knowledge across them. Sustainability concepts from the first MOOC can guide decisions in the green MOOC. Digital skills can improve data collection and analysis in sustainability exercises.

Self-assessment and systematic reflection. At the end of each block, it is helpful to perform a self-assessment. Summaries and goal reviews help evaluate progress and identify areas that require reinforcement.

Complementary resources and cooperation. It is advisable to consult additional literature. Participating in forums or academic communities is also useful. Interaction with other students enriches learning and allows questions to be resolved collaboratively.

7. MOOCS EVALUATION

To ensure the academic quality and alignment of the TECSKILL project's training materials, an evaluation process was carried out for the three MOOCs developed:

1. *First steps to develop a sustainable research project.*
2. *Green Competences Development.*
3. *Digital Competences Development.*

The evaluation was conducted through a survey (Annex I), administered to a panel of external experts, following the same procedure previously used in the evaluation of Work Package 2. This panel was composed of 4 experts from each partner university, reaching a total of 16 evaluators, all with experience in sustainability, digitalization, active methodologies, and teaching material design.

The questionnaire was designed to measure the quality, adequacy, and educational contribution of the MOOCs in relation to green and digital competences, considering their pedagogical coherence, applicability, and depth. The survey was implemented using Microsoft Forms, which enabled the collection of structured and exportable data, as well as the generation of automatic visualizations.

7.1. Evaluation results

The experts assessed four main questions related to the quality of the MOOCs in terms of sustainability and digitalization. The overall results obtained (n = 16) are presented below.

1. **Assessment of the sustainability of the MOOC "First steps to develop a sustainable research project"**

   High: 81,25%

   Medium: 18,75%

   Poor: 0%

2. **Assessment of the digitalization in the same MOOC**

   High: 93,75%

   Medium: 6,25%

   Poor: 0%

3. **Assessment of the sustainability of the MOOC "Green Competences Development"**

   High: 100%

   Medium: 0%

Poor: 0%

4. **Assessment of the digitalization of the MOOC "Digital Competences Development"**

   High: 75%

   Medium: 25%

   Poor: 0%

5. **What is the overall contribution of the three MOOCs to the development of green and digital competences?**

   High: 87,5%

   Medium: 12,5%

   Poor: 0%

The results confirm the high quality of the MOOCs developed within the TECSKILL framework. Satisfaction levels exceed 80% in all evaluated dimensions, demonstrating their relevance, methodological clarity, and alignment with the green and digital competences that the project aims to promote.

Likewise, the overall contribution of the three MOOCs to the development of these competences has been rated as high by more than 80% of the panel, demonstrating the effectiveness of the educational approach adopted.

8. ANNEXES

- Annex I: Questionary for evaluating the MOOCs

1. What is your assessment of the sustainability dimension of the MOOC *"First Steps to Develop a Sustainable Research Project"?*

   - High
   - Medium
   - Poor

2. What is your assessment of the digitalization dimension of the same MOOC?

   - High
   - Medium
   - Poor

3. What is your assessment of the sustainability dimension of the MOOC *"Green Competences Development"?*

   - High
   - Medium
   - Poor

4. What is your assessment of the digitalization dimension of the MOOC *"Digital Competences Development"?*

   - High
   - Medium
   - Poor

5. What is the overall contribution of the three MOOCs to the development of green and digital competences?

   - High
   - Medium
   - Poor

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