



Biomimicry Design for Sustainability Skills in VET

KA220-VET-00620D4B

KA220-VET - Cooperation Partnerships in Vocational Education and Training

WP3 Biomimicry Platform Development

D4.3 Use cases and pilot setup



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Document Info	
Project reference	2023-1-EL01-KA220-VET-000158477
Deliverable	D4.3 Use cases and pilot setup
Dissemination level	Public
Date	28/2/2026
Document version	1
Status	Final
Sharing	CC-BY-NC-ND
Authors	Hariklia Tsalapatas Olivier Heidmann
Reviewers	Ioanna Stefan, ATS Ahu Sismek, Yakacık Vocational and Technical Anatolian High School



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Contributors

Konstantina Vlachoutsou, University of Thessaly

Christina Taka, University of Thessaly

Dimitris Ziogas, University of Thessaly

Konstantinos Katsimantes, University of Thessaly

Sotiris Evaggelou, University of Thessaly

Apostolos Fotopoulos, University of Thessaly

Antoniou Stefan, ATS

Ancuța Georghe, ATS

Carlos Vaz de Carvalho, Virtual Campus

Laura Trevisan, Infodef

Maria Fernandez, Infodef

Stella Regoli, Etudes et Chantiers Corsica ILE



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Table of contents

Contributors	3
1. Introduction	8
2. Evaluation methodology	10
2.1 Quantitative vs. qualitative evaluation approaches	10
2.1.1 Quantitative feedback	10
2.1.2 Qualitative feedback	11
2.2 Formative vs. summative approaches	13
2.2.1 Formative feedback	13
2.2.2 Summative feedback	14
2.3 LET's MIMIC evaluation approach	15
3. Pilot cases setup	18
3.1 Overview of pilot structure	18
3.2 Case 1: Pilot at the University of Thessaly, Greece	19
3.2.1 Summary	20
3.2.2 Context	20
3.3 LET's MIMIC resources to be evaluated	21
3.3.1 Profile and number of participants	22
3.3.2 Foreseen activities	22
3.4 Case 2: Pilot with the 1 st Vocational High School of Volos, Greece	26
3.4.1 Summary	26



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.4.2	Context.....	26
3.4.3	Profile and number of participants.....	27
3.4.4	Foreseen activities	27
3.5	Case 3: Pilot with the VET School of Campanhã, Portugal	30
3.5.1	Summary	30
3.5.2	Context.....	30
3.5.3	Profile and number of participants.....	31
3.5.4	Foreseen activities	31
3.6	Case 4: Pilot with Etudes et Chantiers Corsica ILE, France Case 4: Pilot with Etudes et Chantiers Corsica ILE, France	33
3.6.1	Summary	33
3.6.2	Context.....	34
3.6.3	Profile and number of participants.....	35
3.6.4	Foreseen activities	36
3.7	Case 5: Pilot with VET students from "Ion Ghica" College of Economics, Romania.....	38
3.7.1	Summary	38
3.7.2	Context.....	38
3.7.3	Profile and number of participants.....	39
3.7.4	Foreseen activities	40
3.8	Case 6: Pilot with VET students from "Yakacık Vocational and Technical Anatolian High School", Türkiye	43



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.8.1	Summary	44
3.8.2	Context.....	44
3.8.3	Profile and number of participants.....	45
3.8.4	Foreseen activities	45
3.9	Case 7: Pilot with VET students from "CIFP Juan de Herrera", Spain	49
3.9.1	Summary	49
3.9.2	Context.....	49
3.9.3	Profile and number of participants.....	51
3.9.4	Foreseen activities	51
4.	Conclusions	53
	Appendix I – Individual evaluation questionnaire	54
	Appendix II – Team evaluation questionnaire	56
	Appendix III – Questionário de Avaliação Individual - PT	57
	Appendix IV – Questionário de avaliação da equipa - PT	59
	Appendix V – Questionnaire individuel - FR	60
	Appendix VI – Questionnaire Equipe - FR	62
	Appendix VII – Chestionar de evaluare – RO	63
	Appendix VIII – Chestionar de evaluare pentru echipe - RO	65
	Appendix IX – Cuestionario de evaluación individual - ES.....	66
	Appendix X – Cuestionario de evaluación del equipo - ES	68
	Appendix XI – Bireysel değerlendirme anketi - TR.....	69



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix XII – Grupla deđerlendirme anketi - TR	71
References	72



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

1. Introduction

Biomimicry, the practice of learning from and mimicking nature's solutions to human challenges, is increasingly recognised as a powerful approach to innovation and sustainability in design. As the global community faces complex environmental and societal challenges, designers and engineers look to the natural world for inspiration to create efficient, sustainable, and resilient solutions. Integrating biomimicry into educational curricula fosters creativity and problem-solving skills and instils a deep respect for nature and its processes. Biomimicry introduces a framework for designing solutions by drawing on natural models and processes. The methodology applies the steps DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE to identify a challenge, encourage inspiration from nature, inquire, redefine the challenge by integrating discovery results, emulate natural models to synthesise a solution, and evaluate outcomes.

Project LET's MIMIC develops digital resources and services for students to build awareness, knowledge, and competencies among VET students in deploying biomimicry. The project develops student resources, including a Self-Regulated Learning Kit and Training Modules, digital learning resources, and a Biomimicry Digital Learning Platform that supports collaborative student teams in emulating the biomimicry steps for solution synthesis to modern challenges. In addition, the project develops supporting educational material for trainers, including a handbook on applying biomimicry in learning. It further delivers capacity-building activities for trainers and multiplier events for promoting the uptake of project results within and beyond the consortium.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

LET's MIMIC outcomes, including the biomimicry methodology, the digital learning platform, and the digital open educational resources, are piloted in real-life contexts with students and educators. During the evaluation and piloting process, external student groups use project results to provide feedback that is integrated into implementation, ensuring that outcomes are relevant and address user interests and needs. Piloting takes place in Greece, Romania, Turkey, France, Spain, and Portugal with external groups of students and educators. This broad European footprint of piloting activities in diverse educational and cultural contexts ensures that the results are applicable and relevant across Europe, maximising the positive impact of project implementation.

This report presents the methodological design of the LET's MIMIC evaluation and piloting activities. The report presents the evaluation methodology, tools, mechanisms for generating feedback, and piloting cases. Six piloting cases are developed, one for each partner and country in the consortium, namely Greece, Romania, Turkey, France, Spain, and Portugal. The cases include a description of the groups participating in evaluation, the context, and the activities planned for generating student and educator feedback.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

2. Evaluation methodology

The LET's MIMC evaluation methodology aims to promptly generate ongoing, objective feedback on project outcomes, allowing their integration into the project and ensuring they address user needs for developing nature-inspired innovation and design competencies. Evaluation planning activities begin early in the implementation, with implementation to start in the fall of 2025. Evaluation is an ongoing process spanning the entire 3rd year of project implementation, with results gradually integrated to improve project activities and outcomes continuously.

2.1 Quantitative vs. qualitative evaluation approaches

A robust evaluation strategy benefits from integrating **quantitative** and **qualitative** approaches, enabling a more comprehensive understanding of project outcomes and impacts.

2.1.1 Quantitative feedback

Quantitative evaluation refers to the systematic use of numerical data to measure a solution's performance, outcomes, and impacts. It focuses on collecting data that can be quantified, statistically analysed, and compared across groups or time periods. This approach helps assess the extent of change, identify patterns across participant groups, and provide generalisable evidence of effectiveness (Creswell & Creswell, 2018). Quantitative evaluation is beneficial for assessing measurable outcomes, such as knowledge gains, performance indicators, participation rates, and changes over time (Rossi et al, 2004).

Quantitative evaluation can take many forms. This may include:



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- **Surveys and questionnaires**, structured instruments with closed-ended questions, are used to generate consistent, comparable data (Trochim et al, 2016).
- **Tests or assessments** that produce numerical data for analysis (Creswell & Creswell, 2018).
- **Statistical data**, for example, on content completed or student engagement (Field, 2018).

Quantitative evaluation's benefits lie in its objectivity, which allows evaluators to analyse why a solution is effective or impactful, to draw statistically supported conclusions, and to generalise findings across larger groups. It enables data-driven decision-making.

It is often used together with qualitative approaches in mixed-method evaluations to gain a fuller picture of program performance.

2.1.2 Qualitative feedback

Qualitative evaluation refers to descriptive, non-numerical information provided to learners to support improvement, reflection, and deeper understanding. Unlike quantitative feedback, which typically focuses on scores or measurable indicators, qualitative feedback emphasises **meaning, interpretation, and guidance**. It often takes the form of written comments, verbal exchanges, open-ended reflections, or narrative evaluations.

A key strength of qualitative feedback is that it helps learners understand **how and why** learning is effective. It highlights processes and provides opportunities to generate descriptive feedback, rather than through numbers or statistics. It helps explore the effectiveness of new or innovative learning design, understand students' needs, motivations, and barriers, evaluate processes rather than only outcomes, and focus on learning, behavioural change, or community impact.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Qualitative indicators can complement quantitative data when quantitative data alone is insufficient (Patton, 2015; Flick 2028).

This type of feedback is especially valuable in encouraging critical thinking, creativity, problem-solving, and personal development. Qualitative approaches are user-centred, encourage dialogue, and can provide specific, constructive, and actionable information for improving project outcomes (Hattie & Timperley 2007).

Qualitative evaluation seeks to explore experiences, perceptions, and meanings that cannot be fully understood through numerical indicators alone. Qualitative research provides rich, in-depth insights into how participants interact with the Biomimicry Digital Learning Platform and its resources, interpret its value, and integrate new knowledge into their practice, using methods such as focus groups/case studies. This perspective allows evaluators to uncover contextual factors, barriers, and enablers that influence learning processes and outcomes (Patton, 2015; Merriam & Tisdell, 2016).

Qualitative evaluation can take many forms. This may include:

- **Interviews**, individual or group, that help explore experiences and perceptions in depth (Kvale & Brinkmann 2015).
- **Focus groups**, in which several participants discuss shared experiences and express collective views (Krueger & Casey 2015).
- **Observation**, used to document behaviours, interactions, and real-time processes, helping evaluators understand why a program functions or does not in practice (Patton, 2002).



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- **Case studies**, which provide contextual feedback through application of a solution in a specific environment (Yin, 2018).
- **Documentation and analysis** for extracting practical and actionable information from user feedback that can be integrated into project results (Braun & Clarke, 2006).

2.2 Formative vs. summative approaches

Formative evaluation occurs during project implementation, generating ongoing feedback to improve outcomes. **Summative evaluation** is conducted upon completion of a learning intervention to assess its effectiveness. Both approaches will be applied in LET's MIMIC.

2.2.1 Formative feedback

Formative evaluation refers to feedback collected during a project's implementation to improve outcomes before the result is achieved. It is ongoing, interactive, and development oriented. Its purpose is to generate timely feedback that helps project teams identify strengths, weaknesses, and emerging issues early enough to make meaningful adjustments. By supporting continuous improvement rather than post-hoc judgment, formative evaluation increases the likelihood that the project will achieve its intended results and remain aligned with stakeholder needs. It helps researchers and implementation teams to reach project objectives (Scriven, 1991).

The benefits of formative feedback are that it provides specific guidance on strengths and areas for improvement, supports the monitoring and adjustment of implementation, facilitates a deeper understanding of why a solution works, and focuses on processes rather than just outcomes. It often takes a dialogic form, allowing participants to respond, ask questions, and engage.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Formative feedback may take many forms, such as:

- **Piloting**, during which external users provide feedback to be integrated into project outcomes (Patton, 2025).
- **Reviews after use**, in which discussions document user experiences (Rossi et al, 2004).
- **Ongoing testing** of functionality for removing errors and encouraging usability.

Formative feedback can have the form of verbal or written communication as well as analytics.

Formative feedback focuses on continuous improvement of results through the engagement of external stakeholders in the development process (Rossi et al., 2004).

2.2.2 Summative feedback

Summative evaluation refers to the assessment of a project's outcomes, effectiveness, and overall impact at or near the end of its implementation. Its purpose is to determine the extent to which the project achieved its intended objectives, produced meaningful results, and delivered value for stakeholders. Unlike formative evaluation, which guides ongoing improvement, summative evaluation provides an overall judgment of performance based on evidence gathered throughout and especially after completion (Scriven, 1991).

In project contexts, summative evaluation examines outcome indicators, the quality of deliverables, target achievement, user or beneficiary impact, outreach, and sustainability. The results of summative evaluation are summarised into a final project evaluation report.

The key differences of formative vs. summative evaluation are:



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Formative evaluation occurs during project implementation and provides timely feedback to improve processes, refine activities, and address emerging challenges. Its purpose is continuous learning and improvement while the project is still in progress.

Summative evaluation occurs at the end of a project and assesses overall effectiveness, outcomes, and impact. Its purpose is to judge the project's success and inform future decision-making.

In short, **formative evaluation** supports improvement **along the way**, while **summative evaluation** assesses performance **after the journey is complete**.

2.3 LET's MIMIC evaluation approach

LET's MIMIC follows a **mixed methods evaluation design**. The project deploys:

- **Formative evaluation** to inform and improve project outcomes, ensuring they best address learner needs.
- **Summative evaluation** to document project achievement upon completion into a report.

LET's MIMIC formative internal evaluation involves project partners testing the Biomimicry Digital Learning Platform and providing technical input to address potential issues and enhance usability. **This process is not included in this deliverable.**

LET's MIMIC formative external evaluation involves external groups of students who engage with project outcomes, specifically the biomimicry methodology, Biomimicry Digital Learning Platform, Self-Paced Learning Kit, and Training modules, in the context of real-life learning activities within formal or informal educational practices. Participants then provide feedback in qualitative and quantitative manners.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

During piloting, **quantitative results** establish measurable evidence of impact, while **qualitative insights** explain how and why these outcomes occur. This integration ensures that the evaluation of LET's MIMIC measures effectiveness and captures the nuanced experiences of students and educators, thereby supporting continuous improvement.

Within the LET's MIMIC evaluation, **quantitative data** will be collected primarily through structured questionnaires administered to participating students and educators at the pilot sites. The questionnaires will measure key dimensions, including ease of use of the digital platform, clarity of the biomimicry steps, perceived learning gains, and the effectiveness of the Self-Regulated Learning Kit, Training Modules, and Biomimicry Learning Platform. This approach enables the systematic collection of comparable data across all partner countries, providing statistical insights into engagement, satisfaction, and knowledge development levels. The resulting data will allow the project team to identify patterns, assess consistency of outcomes across diverse VET contexts, and establish a measurable baseline for evaluating the effectiveness and transferability of the LET's MIMIC digital learning intervention.

In addition to questionnaires, **qualitative evaluation** will be conducted through open-ended questions answered collectively by **student focus groups** during pilot activities. This group-based reflection will provide rich insights into participants' experiences and perceptions of the LET's MIMIC resources. Feedback will focus on the **relevance** of biomimicry content to their field of study, the **acceptance** and ease of integrating the methodology into learning practices, the **completion** of activities within the platform, and the **quality of results** produced through the biomimicry steps. Additional themes will include the **usability and accessibility** of the digital platform, the **clarity and applicability** of the Self-Regulated Learning Kit, Training Modules, and Biomimicry Learning Platform, the **collaborative learning experience** within teams, and the



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

perceived impact on creativity, problem-solving, and sustainability awareness. This qualitative dimension will help uncover contextual factors influencing engagement, highlight strengths and limitations of the project outputs, and provide nuanced guidance for refining content and methodology.

The following tools will be used during LET's MIMIC piloting and evaluation:

- An **individual evaluation questionnaire**, which will be quantitative in nature and aim to produce feedback on project outcomes, namely the Biomimicry Digital Learning Platform, Self-Regulated Learning Kit, and Training Modules.
- A **team evaluation questionnaire**, which will be qualitative and engage students in groups discussions on project relevance, acceptance, usability, collaboration, and impact.

The 2 questionnaires, individual and team, are attached as appendices in this report. They have been translated to partner national languages to facilitate the evaluation process. As a result, 12 questionnaires are available.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3. Pilot cases setup

Pilot sites are established in **Greece, Romania, Turkey, France, Spain, and Portugal**, providing a wide geographical footprint across Europe. This distribution ensures that the piloting process captures feedback from diverse cultural, educational, and institutional contexts, reflecting the realities of VET systems in both Southern and Eastern Europe. Such diversity strengthens the validity and relevance of the evaluation findings, as the Biomimicry Learning Platform, Self-Regulated Learning Kit, and Training Modules will be tested in varied environments. By comparing results across countries, the project can identify **context-specific challenges** and **common success factors**, enabling the development of good practice recommendations with broad applicability. This approach ensures that the lessons learned from LET's MIMIC are not limited to individual pilot sites but contribute to a **European framework for integrating biomimicry into VET**, enhancing the project's sustainability and transferability across the continent.

3.1 Overview of pilot structure

General guidelines for the organisation of the pilots are provided below regarding structure, resources, and feedback generation. However, partners will have flexibility in setting up and organising pilots that consider regional and national priorities and address VET needs across diverse contexts. This flexibility will further enable educators to tailor and adapt LET's MIMIC learning methodologies and resources to their specific schools' learning objectives and curricula, maximising the benefit of engaging their students with LET's MIMIC.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

The following general phases are foreseen in piloting:

Piloting phase	Activities
Phase 1: Inspiration	Students are familiarised with concepts, practices, and biomimicry steps: DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE. They are further familiarised with examples of successful biomimicry design. As resources, students can use the Self-Regulated Learning Kit as a reference, specifically the 60 Biomimicry and corresponding Biomimicry Solutions that demonstrate the added value of biomimicry in practice. Alternatively, they may receive a presentation of biomimicry examples.
Phase 2: Challenge selection	Students and/or educators select a challenge to work on, whether at the team or class level. They can refer to the Biomimicry Open Challenges and fully expanded Training Modules to identify an intriguing open question to address through biomimicry. Alternatively, based on specific learning needs and objectives, educators may select a challenge for students to address.
Phase 3: Applying biomimicry	Students can use the LET's MIMIC Biomimicry Digital Learning Platform to collaborate and apply the biomimicry steps DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE for synthesising a solution inspired by nature.
Phase 4: Feedback generation	Students respond to the individual and team questionnaires presented in Appendices I and II.

Table 1. Piloting structure.

The following sections describe the setup of 6 piloting cases, to be implemented in Greece, Turkey, Romania, France, Spain, and Portugal.

3.2 Case 1: Pilot at the University of Thessaly, Greece

The piloting case will be implemented within the formal curriculum of the University of Thessaly, Department of Electrical and Computer Engineering. It directly aligns with the departmental



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

objectives of building innovation and design skills by familiarising students with the concepts and practical applications of biomimicry to address modern challenges. As a result of belonging to the Polytechnic School of the University of Thessaly, the Department of Electrical and Computer Engineering is a vocational training provider at the tertiary level (EQF 6 - 8) based on the corresponding definition of the European Union, which links practical, hands-on educational practices with vocational principles (European Commission, 2026).

3.2.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	Greece
Location	University of Thessaly, Department of Electrical and Computer Engineering (DECE), Volos, Greece
Implementation timeline	Fall 2025 academic semester
Participant profile	Students of the Department of Electrical and Computer Engineering, University of Thessaly
Number of participants	Approximately 130

Table 2. Summary of piloting case at the University of Thessaly.

3.2.2 Context

Institution where the pilot will take place

The first pilot in Greece will take place at the Department of Electrical and Computer Engineering in Volos, Greece, in the fall 2025 - 2026 academic semester.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Learning offering/program where the pilot will take place

The pilot will take place within the ECE553: Design Thinking course of the Department of Electrical and Computer Engineering, an elective for 4th-year students in the department's formal undergraduate program.

Rationale for selecting this context

The Design Thinking course builds innovation capacity for young engineers. It develops competencies in designing solutions that better address user needs through empathy, observation, discovery, prototyping, and evaluation. The course was integrated into the Department of Electrical and Computer Engineering undergraduate studies program to develop design skills among young engineers, a necessary competence for today's fast-moving world, where critical, analytical, and systems thinking are highly relevant and industry demanded.

3.3 LET's MIMIC resources to be evaluated

The following resources will be evaluated through piloting:

- **The LET's MIMIC Self-Regulated Learning Kit:** This includes:
 - **Biomimicry Cases and Solutions:** 60 world challenges addressed through biomimicry and the descriptions of the implemented solutions inspired by natural models and processes.
 - **Biomimicry Open Challenges:** 60 open challenges that students can address through biomimicry design to introduce solutions inspired by natural models and processes.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- **The LET's MIMIC Training Modules:** 10 comprehensive end-to-end training modules based on biomimicry concepts and steps that guide students through applying biomimicry steps while providing suggested resources and activities.
- **The LET's MIMIC Biomimicry Digital Learning Platform:** The learning platform provides an online environment for team collaboration in biomimicry solution design by following the biomimicry steps DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE.
- **The Educator Handbook:** A reference resource for educators. It provides explanations and guidelines on integrating biomimicry approaches into classroom design practices.

3.3.1 Profile and number of participants

Participants are undergraduate students in the fourth and fifth years of the 5-year DECE diploma program. As future Electrical and Computer Engineers, students need to develop a sound technical background as well as soft skills, such as analytical and critical thinking, entrepreneurial thinking, collaboration capacity, learning to learn, and more, that will empower them to adapt to the rapidly evolving digital economy throughout their careers.

Approximately 130 students enrolled in the course in the fall 2025 academic semester. They will all participate in the pilot.

3.3.2 Foreseen activities

Students will apply biomimicry concepts, steps, and approaches to develop solutions inspired by nature that address modern sustainability challenges, such as reducing air pollution, addressing



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

plastic pollution, supporting biodiversity on land and at sea, designing green cities, ensuring clean and affordable energy for all, and mitigating natural disasters stemming from climate change.

The pilot will run for the entire semester. Students will work collaboratively on formal projects that contribute to the final student grade for the course. Student inquiry, discovery, collaboration, brainstorming, and solution synthesis will be guided through LET's MIMIC resources, including the Self-Regulated Learning Kit, Training Modules, and the Biomimicry Digital Learning Platform.

Following is a description of suggested LET's MIMIC resources that can be integrated into the piloting and how they will be used in different phases of the implementation:

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	At the beginning of the course, students are encouraged to select a sustainability challenge. Throughout the semester, they will design innovative solutions that better address users' actual, rather than perceived, needs. At this stage, students will review LET's MIMIC resources, such as Biomimicry Cases and Solutions, which describe how biomimicry has already been used to address modern challenges with inspiration from natural patterns and processes. They may further review additional resources linked to green, sustainable, and cyclical practices. This review will inspire idea generation later in the semester, when they are called to design solutions to open challenges.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	Students will select a challenge for two separate activities: First, they will select a sustainability challenge to focus on for the entire semester. This may involve one of the Challenges and Cases introduced by the project or additional inspirational activities of interest to students. They will use the Biomimicry Digital Learning Platform for collaboration and solution synthesis. Secondly, the educator will select one LET's MIMIC training module, which students will follow step-by-step in 4 dedicated learning sessions. Examples of LET's MIMIC activities that may be applied are presented below. The cases are selected for their direct links to the department's curriculum. Suggested Biomimicry Challenges ● CS21 Efficient heat dissipation in electronics inspired by nature. ● CS22 Nature-inspired solutions for reducing urban heat islands. ● CS23 Anti-reflective surfaces for enhanced solar panel efficiency. ● CS24 Bio-inspired traffic flow optimisation in smart cities ● CS25 Improved structural stability for bridges using biomimicry. ● CS26 Sustainable water transportation methods inspired by marine life. ● CS27 Enhanced food storage systems with nature-inspired insulation.
---	---	--



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		● CS28 Nature-inspired methods to reduce urban light pollution. ● CS29 Anti-erosion techniques for coastal protection based on mangroves. Suggested Training Modules ● TM06 The termite mounds' tunnels and building design for efficient cooling and ventilation. ● TM08 High-speed and quieter passenger trains inspired by the kingfisher, the owl and the penguin. ● TM10 Eco-friendly urban noise reduction inspired by nature.
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	In the next step, student teams will use LET's MIMIC Biomimicry Learning Platform to collaborate on executing the biomimicry steps DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE to resolve the challenge in focus.
Phase 4: Feedback generation	Individual & team questionnaires	Students will respond to the individual and team questionnaires presented in Appendices I and II. Results will be analysed, integrated into project outcomes, and summarised into deliverable D4.4 Biomimicry piloting implementation, a document that presents evaluation activities and results.

Table 3. Piloting Case 1 structure at the University of Thessaly, Greece.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.4 Case 2: Pilot with the 1st Vocational High School of Volos, Greece

The piloting case will be implemented with students enrolled at the 1st Vocational High School of Volos, Greece. Activities will be linked to school curricula, strengthening vocational, practical, and applied skills.

3.4.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	Greece
Location	University of Thessaly, Department of Electrical and Computer Engineering (DECE), Volos, Greece
Implementation timeline	Fall 2025 and spring 2026 academic semesters
Participant profile	Students enrolled at the 1 st Vocational High School of Volos, Greece
Number of participants	Approximately 30

Table 4. Summary of piloting case at the 1st Vocational High School of Volos, Greece.

3.4.2 Context

Institution where the pilot will take place

The second pilot in Greece will take place at the 1st Vocational High School of Volos, Greece.

Learning offering/program where the pilot will take place

The pilot will take place during the school's formal educational visits, which aim to enrich learning experiences by connecting education to the real world.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Rationale for selecting this context

Activities directly connect biomimicry with real-world environmental and engineering challenges that align with vocational education learning objectives. Issues such as noise reduction, sustainable energy production, flood and wildfire protection, urban heat island mitigation, and microplastics pollution reflect the types of problems VET students encounter in fields like electrical engineering, construction, renewable energy, and environmental technology. By working on these challenges, students apply their technical knowledge in a practical context, develop creativity and systems thinking through biomimicry, and build green skills relevant to emerging job markets. The activities also support experiential learning, interdisciplinary collaboration, and sustainability awareness—core priorities in modern vocational training.

3.4.3 Profile and number of participants

Participants will be students enrolled in any of the three years of study in vocational high school education. Approximately 30 students will participate in the pilot.

3.4.4 Foreseen activities

Students will apply biomimicry concepts, steps, and approaches to develop solutions inspired by nature that address modern challenges related to vocational education learning objectives, such as noise reduction in cities, sustainable energy production, flood and wildfire protection, urban heat island mitigation, microplastics pollution, and more.

Students will work in teams following the biomimicry steps to design innovative solutions to a selected challenge. They will use the Biomimicry Digital Learning Platform for collaboration. The Self-Regulated Learning Kit and Training Modules will directly inspire activities during the pilot.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Following is a description of suggested LET's MIMIC resources that can be integrated into the piloting and how they will be used in different phases of the implementation:

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	Students will be familiarised with examples of biomimicry, namely the challenges that have been addressed through it. These examples will provide inspiration that students will draw upon when designing their own solutions.
Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	The educator will select an activity from the open challenges and Training Modules developed in the project. Suggested biomimicry challenges from which the educator will select an activity are linked to vocational educational objectives: Suggested Biomimicry Challenges ● CS5 Efficient micro-plastic removal from oceans. ● CS6 Sustainable light production without electricity. ● CS8 Wildfire prevention and early detection. ● CS9 Urban flood management systems. ● CS11 Microplastic pollution in oceans prevention. ● CS21 Efficient heat dissipation in electronics inspired by nature. ● CS22 Nature-inspired solutions for reducing urban heat islands.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		- CS28 Nature-inspired methods to reduce urban light pollution. Suggested Training Modules - TM01 Stylish and efficient ceiling fan inspired by the aerodynamics of the Sycamore tree seeds. - TM04 Reflecting road studs inspired by the Cat eyes glow in the dark. - TM06 The termite mounds' tunnels and building design for efficient cooling and ventilation. - TM08 High-speed and quieter passenger trains inspired by the kingfisher, the owl and the penguin. - TM10 Eco-friendly urban noise reduction inspired by nature.
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	In the next step, student teams will use LET's MIMIC Biomimicry Learning Platform to collaborate on executing the biomimicry steps DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE to resolve the challenge in focus.
Phase 4: Feedback generation	Individual & team questionnaires	Students and educators respond to the individual and team questionnaires presented in Appendices I and II. Results will be analysed, integrated into project outcomes, and summarised into deliverable D4.4 Biomimicry piloting implementation, a document that presents evaluation activities and results.

Table 5. Piloting Case 2 structure at the University of Thessaly, Greece.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.5 Case 3: Pilot with the VET School of Campanhã, Portugal

The piloting case will be implemented with students enrolled at the VET School of Campanhã, Portugal. Activities will be linked to school curricula, strengthening vocational, practical, and applied skills.

3.5.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	Portugal
Location	Escola Profissional de Campanhã (VET School), Portugal
Implementation timeline	Fall 2025 and spring 2026 academic semesters
Participant profile	Students enrolled at the 1st Vocational High School of Campanhã, Portugal
Number of participants	Approximately 30

Table 6. Summary of piloting case at the VET School of Campanhã, Portugal.

3.5.2 Context

Institution where the pilot will take place

The piloting in Greece will take place at the VET School of Campanhã, located in Porto, Portugal.

Learning offering/program where the pilot will take place

The pilot will take place during the school's formal educational visits, which aim to enrich learning experiences by connecting education to the real world.

Rationale for selecting this context



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

The activities provide a direct link between biomimicry and real-world environmental and engineering challenges that align with vocational education goals. Topics such as noise reduction, sustainable energy generation, flood and wildfire resilience, urban heat island mitigation, and microplastic pollution represent the kinds of issues commonly faced in fields like electrical engineering, construction, renewable energy, and environmental technology. By engaging with these challenges, students apply technical knowledge in practical contexts while enhancing creativity and systems thinking through biomimicry. They also develop green skills that are increasingly valuable in emerging job markets. Additionally, the activities promote experiential learning, interdisciplinary collaboration, and sustainability awareness—key priorities in contemporary vocational training.

3.5.3 Profile and number of participants

Participants will be students enrolled in any of the three years of study in vocational high school education. Approximately 30 students will participate in the pilot.

3.5.4 Foreseen activities

Students will apply biomimicry concepts, steps, and approaches to develop solutions inspired by nature that address modern challenges related to vocational education learning objectives.

Students will work in teams following the biomimicry steps to design innovative solutions to a selected challenge. They will use the Biomimicry Digital Learning Platform for collaboration. The Self-Regulated Learning Kit and Training Modules will directly inspire activities during the pilot.

Following is a description of suggested LET's MIMIC resources that can be integrated into the piloting and how they will be used in different phases of the implementation:



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	Students will be familiarised with examples of biomimicry, namely the challenges that have been addressed through it. These examples will provide inspiration that students will draw upon when designing their own solutions.
Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	The educator will select an activity from the open challenges and Training Modules developed in the project. Suggested biomimicry challenges from which the educator will select an activity are linked to vocational educational objectives: Suggested Biomimicry Challenges ● CS4 Waste-free packaging alternative. ● CS6 Sustainable light production without electricity. ● CS8 Wildfire prevention and early detection. ● CS9 Urban flood management systems. ● CS19 Improving Urban Noise Reduction ● CS48 Smart fishing nets to avoid capturing threatened species. Suggested Training Modules ● TM02 Shark skin swimsuit to reduce drag. ● TM05 Multi-functional biodegradable shoes inspired by the biodegradability of algal organic matter. ● TM07 Design a subway or railway network less prone to disruption inspired by the adaptive behaviour of slime mould.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		• TM08 High-speed and quieter passenger trains inspired by the kingfisher, the owl and the penguin. • TM09 Safe, waterless and portable toilets.
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	In the next step, student teams will use LET's MIMIC Biomimicry Learning Platform to collaborate on executing the biomimicry steps DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE to resolve the challenge in focus.
Phase 4: Feedback generation	Individual & team questionnaires	Students and educators respond to the individual and team questionnaires presented in Appendices I and II. Results will be analysed, integrated into project outcomes, and summarised into deliverable D4.4 Biomimicry piloting implementation, a document that presents evaluation activities and results.

Table 7. Piloting Case 3 structure at the VET School of Campanhã, Portugal.

3.6 Case 4: Pilot with Etudes et Chantiers Corsica ILE, France Case 4: Pilot with Etudes et Chantiers Corsica ILE, France

3.6.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	France
Location	Etudes et Chantiers ILE Corsica (Bastia/Folelli/Miomo – training and ACI sites)
Implementation timeline	Fall 2025 and spring 2026 academic semesters



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Participant profile	Young people in socio-professional integration pathways and learners enrolled in ECC training or ACI workshops
Number of participants	Approximately 25

Table 8. Summary of piloting case at the Etudes et Chantiers Corsica ILE, France.

3.6.2 Context

Institution where the pilot will take place

The pilot in France will take place within Etudes et Chantiers ILE Corsica, a non-profit association specialised in socio-professional integration through environmental, ecological, and community-oriented activities. ECC manages several Ateliers et Chantiers d’Insertion (ACI) dedicated to green spaces, circular economy, soft mobility, and social support.

Learning offering/program where the pilot will take place

The pilot will be implemented within ECC’s **training and insertion activities**, including:

- ACI workshops on **green spaces / landscaping**.
- Environmental awareness sessions.
- Collective workshops on sustainability and ecological transition.

These frameworks allow participants to explore practical ecological challenges directly linked to their professional projects.

Rationale for selecting this context

The ECC context is highly relevant for piloting biomimicry because:



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- Participants frequently work on real environmental challenges (waste reduction, forest fire prevention, biodiversity, soil restoration, sustainable maintenance of green spaces).
- Biomimicry fits perfectly with the association's mission of sustainability, environmental stewardship, and practical ecological education.
- The learners benefit from hands-on learning, making the biomimicry steps (DEFINE → BIOLOGIZE → DISCOVER → ABSTRACT → EMULATE → EVALUATE) very intuitive.
- The pilot strengthens green skills needed in emerging jobs (environmental maintenance, nature-based solutions, ecological landscaping).

3.6.3 Profile and number of participants

Participants will be:

- Young people engaged in socio-professional integration programs.
- Learners in vocational pathways (green spaces, construction, environment, maintenance).
- Apprentices or trainees enrolled in courses delivered on ECC sites.

Most learners have a practical orientation and benefit from visual, applied, and real-world learning scenarios.

Estimated number of participants: Twenty five divided into small teams working on different biomimicry challenges.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.6.4 Foreseen activities

Participants will apply biomimicry concepts to design nature-inspired solutions related to their professional environment.

The pilot will follow the four standard phases defined in the report

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	Learners will discover concrete biomimicry examples (e.g., fire-resistant ecosystems, natural water filtration, termite-inspired cooling). This will introduce ecological innovation and inspire ideas for their own projects.
Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	ECC will select challenges aligned with local environmental issues and ACI activities, such as: Suggested Biomimicry Challenges relevant to ECC's work ● CS8 Wildfire prevention and early detection. ● CS9 Urban / rural flood management. ● CS11 Microplastic pollution prevention. ● CS22 Reducing urban heat islands. ● CS28 Nature-inspired light pollution reduction. ● CS5 Efficient microplastic removal (for coastal areas). Suggested Training Modules ● TM06 Termite mound cooling for natural ventilation.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		● TM10 Urban noise reduction inspired by nature. ● TM01 Sycamore seed aerodynamics (useful for soft mobility / wind flow studies). ● TM04 Cat-eye reflective systems (useful for safety in public spaces).
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	Teams will collaborate on the platform to follow all biomimicry steps: 1. DEFINE – identify the local need (e.g., fire prevention around paths). 2. BIOLOGIZE – translate the problem into a biological question. 3. DISCOVER – explore natural models. 4. ABSTRACT – extract principles. 5. EMULATE – create a practical idea or prototype. 6. EVALUATE – check feasibility in the ECC context. The platform will support structured teamwork and documentation.
Phase 4: Feedback generation	Individual & team questionnaires	Students and educators respond to the individual and team questionnaires presented in Appendices I and II. Results will be analysed, integrated into project outcomes, and summarised into deliverable D4.4 Biomimicry piloting implementation, a document that presents evaluation activities and results.

Table 9. Piloting Case 4 structure at the Etudes et Chantiers ILE Corsica, France.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.7 Case 5: Pilot with VET students from "Ion Ghica" College of Economics, Romania

The piloting case will be implemented with students enrolled at "Ion Ghica" College of Economics in Târgoviște. Activities will be linked to school curricula, strengthening vocational, practical, and applied skills in economics, tourism, food services, and commerce.

3.7.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	Romania
Location	"Ion Ghica" College of Economics, Targoviste
Implementation timeline	Spring 2026 academic semesters
Participant profile	Students enrolled at the "Ion Ghica" College of Economics, profiles economics, tourism, food services, and commerce.
Number of participants	Approximately 25

Table 10. Summary of piloting case at the "Ion Ghica" College of Economics, Romania.

3.7.2 Context

Institution where the pilot will take place

The piloting in Romania will take place at Colegiul Economic „Ion Ghica”, located in Târgoviște, Dâmbovița County.

Learning offering/program where the pilot will take place



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

The pilot will be integrated into formal educational activities and thematic activities that aim to enrich learning experiences by connecting education to real-world challenges relevant to the profile of the students.

Rationale for selecting this context

The activities provide a direct link between biomimicry and real-world challenges in sustainable tourism, food safety, packaging, and resource efficiency, topics aligned with vocational education goals. Issues such as sustainable packaging, waste reduction, energy-efficient lighting, noise mitigation, water management, together with innovative solutions for indoor and outdoor, safety, and recycling, are increasingly relevant for sectors such as economics, hospitality, catering, and retail. These biomimicry-inspired approaches address practical challenges like reducing plastic pollution, improving outdoor settings and indoor comfort through nature inspired products, enhancing customer experience with noise-reducing structures, and optimizing resource use in tourism and food services.

3.7.3 Profile and number of participants

Participants will be students enrolled in any of the four years of vocational high school education in economics, tourism, food services, and commerce. Approximately 25 students will participate in the pilot.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.7.4 Foreseen activities

During the pilot, students will explore how nature solves complex problems and will translate these principles into practical solutions for economics, tourism, food services, and commerce. Working in collaborative teams, they will follow the biomimicry design process: DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE, to tackle real-world challenges such as sustainable packaging, energy-efficient lighting, noise reduction, and water management.

To support this process, students will use the Biomimicry Digital Learning Platform as a central hub for teamwork and idea development. Activities will be guided by the Self-Regulated Learning Kit and enriched by Training Modules that provide examples and structured steps for applying biomimicry in vocational contexts.

Below is an overview of the LET's MIMIC resources integrated into the pilot and their role in each implementation phase:

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	At the start of the pilot, students will explore real-world examples of biomimicry to understand how nature's strategies have inspired innovative solutions across different industries. These case studies will showcase practical applications, such as sustainable packaging, energy-efficient lighting, and noise-reducing designs, different nature inspired solutions with economic values, demonstrating how biological principles can solve human challenges. By analysing these examples, students will gain insights into the biomimicry



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		design process and identify patterns that can be adapted to their own vocational context. This initial phase serves as a creative springboard, helping students generate ideas and shape their own nature-inspired solutions for economics, tourism, food services, and commerce.
Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	Educators will select challenges relevant to economics, tourism, food services, and commerce from the list below. Suggested biomimicry challenges from which the educator will select an activity are linked to vocational educational objectives: Suggested Biomimicry Challenges ● C04 Nature-inspired ceiling fans – Aerodynamics of Sycamore tree seeds for energy-efficient ventilation in restaurants and hotels. ● C11 Biodegradable materials – Inspired by algae for eco-friendly products in hospitality and retail. ● C12 Reflecting road studs to increase safety – Cat eyes glow in the dark for safer tourism transport and parking areas. ● C13 Sustainable packaging – Nature-inspired circular economy for food and retail products. ● C18 Filtering plastic pollution – Inspired by manta ray for reducing plastic waste in food industry.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		● C19 Preservative packets to reduce waste – Inspired by fruits and vegetables to extend shelf life in catering and commerce. ● C44 Sustainable water management – Inspired by cactus for efficient water use in hospitality. ● C54 Energy-efficient lighting – Firefly-inspired LED solutions for restaurants and hotels. ● C66 Noise-reducing structures – Owl feather-inspired acoustic panels for tourism spaces and dining Suggested Training Modules ● TM01 Nature-inspired ceiling fans. ● TM03 Efficient water harvesting in arid environments inspired by the beetles that drink water from air. ● TM04 Reflecting road studs to increase safety on public roads. ● TM06 Building design for efficient cooling and ventilation. ● TM10 Eco-Friendly Urban Noise Reduction Inspired by Nature.
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	In the following phase, student will be divided in groups and will actively collaborate on the LET's MIMIC Biomimicry Learning Platform, using it as a workspace to apply the full biomimicry design cycle. Guided by the steps: DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE, they will transform nature-inspired insights into



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		practical solutions for their chosen challenge. The platform will enable students to share ideas, document progress, and integrate feedback, ensuring a structured and interactive approach to developing innovative concepts for economics, tourism, food services, and commerce.
Phase 4: Feedback generation	Individual & team questionnaires	At the final stage, both students and educators will complete individual and team questionnaires designed to capture feedback on the learning experience and collaboration process. These responses will provide valuable insights into the effectiveness of the biomimicry approach and the relevance of the activities to vocational education. The collected data will be systematically analysed and incorporated into the project's evaluation framework. Findings will be consolidated and presented in Deliverable D4.4 – Biomimicry Piloting Implementation, which will document the evaluation methodology, key outcomes, and recommendations for future practice.

Table 11. Piloting Case 5 structure at the "Ion Ghica" College of Economics, Romania.

3.8 Case 6: Pilot with VET students from "Yakacık Vocational and Technical Anatolian High School", Türkiye

The piloting case will be implemented with students enrolled at "Yakacık Vocational and Technical Anatolian High School" in İstanbul. Activities will be integrated into all relevant subjects at the school but specifically to the "Climate, Environment, And Innovative Solutions" subject which is taken by 10th grade students as optional subjects.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.8.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	Türkiye
Location	Yakacık Vocational and Technical Anatolian High School, İstanbul
Implementation timeline	2025 - 2026 academic year
Participant profile	Students aged between 14 – 18
Number of participants	80 to 150

Table 12. Summary of piloting case at the Yakacık Vocational and Technical Anatolian High School, Türkiye.

3.8.2 Context

Institution where the pilot will take place

Yakacık Vocational and Technical Anatolian High School, İstanbul.

Learning offering/program where the pilot will take place

The pilot will be integrated into vocational and technical training activities and thematic activities that aim to enrich learning experiences by connecting education to real-world challenges relevant to the profile of the students.

Rationale for selecting this context

Yakacık Vocational and Technical Anatolian High School has diverse range of vocational and technical programmes, providing an ideal environment to test the applicability of biomimicry



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

across multiple disciplines. The participating students, aged 14–18, represent seven different fields—Information Technologies, Biomedical Device Technologies, Electric-Electronic Technologies, Woodwork and Interior Design Technologies, Chemistry Technologies, Machine and Design Technologies, and Plumbing Technology and HVAC—where innovation, problem-solving, and sustainable design are highly relevant. This diversity enables the project to evaluate the transferability and effectiveness of the LET’s MIMIC methodology and digital resources in different vocational contexts while fostering interdisciplinary learning and creativity among students.

3.8.3 Profile and number of participants

Students aged between 14 and 18 studying in seven different vocational or technical programmes, namely “Information Technologies”, “Biomedical Device Technologies”, “Electric-Electronic Technologies”, “Woodwork and Interior Design Technologies”, “Chemistry Technologies”, “Machine and Design Technologies” and “Plumbing Technology and HVAC”. Around 80 to 150 students will participate in the pilot activities.

3.8.4 Foreseen activities

During the pilot, students will explore how nature solves complex problems and will translate these principles into practical solutions for economics, tourism, food services, and commerce. Working in collaborative teams, they will follow the biomimicry design process: DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE, to tackle real-world challenges such as sustainable packaging, energy-efficient lighting, noise reduction, and water management.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

To support this process, students will use the Biomimicry Digital Learning Platform as a central hub for teamwork and idea development. Activities will be guided by the Self-Regulated Learning Kit and enriched by Training Modules that provide examples and structured steps for applying biomimicry in vocational contexts.

Below is an overview of the LET's MIMIC resources integrated into the pilot and their role in each implementation phase:

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	At the beginning of the pilot, students will be introduced to a range of real-world biomimicry case studies and nature-inspired solutions that have successfully addressed contemporary sustainability and business challenges. Through the exploration of LET's MIMIC Biomimicry Cases and Solutions, they will examine how natural systems, patterns, and processes have inspired innovative applications across various sectors, including sustainable packaging, energy-efficient technologies, tourism, food services, commerce, and other economically valuable innovations. Students will also be encouraged to identify and select a challenge that will serve as the focus of their work throughout the course. By analysing existing biomimicry examples, they will gain a deeper understanding of the biomimicry design process and how nature's strategies can be adapted to meet real user needs. This initial phase will stimulate creative thinking, support idea generation, and provide a strong foundation for



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		the development of their own innovative, nature-inspired solutions.
Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	Teachers will select challenges and training modules relevant to their students' vocational or technical branches. Below is a suggested considering the departments at the school. Suggested Biomimicry Challenges ● C03 Building design for efficient cooling and ventilation. ● C07 Designing more agile drones. ● C09 Industrial CAD Design Tool. ● C06 Safety and efficiency of aeroplanes. ● C011 Efficient water harvesting in arid environments. ● C44 Sustainable water management. ● C47 Designing structures to withstand extreme weather events. ● C51 Creating a strong, reusable adhesive without the use of chemicals or leaving residue. ● C52 Reducing energy consumption for heating and cooling buildings. ● C57 Developing lightweight yet strong and elastic materials for protective and medical applications. Suggested Training Modules ● TM01 Nature-inspired ceiling fans.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		● TM03 Efficient water harvesting in arid environments inspired by the beetles that drink water from air. ● TM06 Building design for efficient cooling and ventilation. ● TM07 Design a subway or railway network less prone to disruption inspired by the adaptive behaviour of slime mould. ● TM09 Safe, waterless and portable toilets.
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	Students will work collaboratively in groups using the LET's MIMIC Biomimicry Learning Platform as a dedicated workspace for applying the complete biomimicry design process. Following the stages of DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, and EVALUATE, they will be asked to propose practical and innovative solutions addressing their selected challenges by mimicking solutions from the nature. The platform will support teamwork by enabling participants to exchange ideas, track and document their progress, and incorporate peer and mentor feedback throughout the process. This structured and interactive environment will foster the development of creative concepts relevant to the fields of economics, tourism, food services, and commerce.
Phase 4: Feedback generation	Individual & team questionnaires	At the final stage, both students and educators will complete individual and team questionnaires designed to capture feedback on the learning experience and collaboration process.

Table 13. Piloting Case 6 structure at the Yakacık Vocational and Technical Anatolian High School, Türkiye.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.9 Case 7: Pilot with VET students from "CIFP Juan de Herrera", Spain

The piloting case will be implemented with students enrolled at the CIFP Juan de Herrera in Valladolid, Spain. Activities will be linked to school curricula, strengthening vocational, practical, and applied skills.

3.9.1 Summary

The following is a summary of the pilot case.

Location and timeframe	Description
Country	Spain
Location	CIFP Juan de Herrera, Valladolid, Spain
Implementation timeline	Fall 2025 and spring 2026 academic semesters
Participant profile	Students enrolled at the 1 st Vocational High School of Volos, Greece
Number of participants	Approximately 30

Table 14. Summary of piloting case at the CIFP Juan de Herrera, Spain.

3.9.2 Context

Institution where the pilot will take place

The pilot in Spain will take place at CIFP Juan de Herrera, a public Integrated Vocational Training Centre located in Valladolid, Castilla y León. The centre has extensive experience in technical and



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

industrial vocational education and maintains strong links with regional industry through work-based learning and dual vocational training programmes.

Learning offering/program where the pilot will take place

The pilot will be integrated into vocational education activities linked to Transport and Vehicle Maintenance, Mechanical Manufacturing and ICT programmes. Activities will be implemented as part of project-based learning, innovation activities, educational visits, and sustainability-related training initiatives.

Rationale for selecting this context

CIFP Juan de Herrera provides an ideal environment for biomimicry education because its vocational programmes address many of the technological and environmental challenges currently faced by industry.

Students in automotive, railway maintenance, mechanical manufacturing and ICT programmes regularly work with topics such as energy efficiency, thermal management, transportation systems, materials engineering, industrial design, sustainability and digital technologies.

Biomimicry offers an innovative framework through which students can apply technical knowledge to real-world challenges while developing creativity, systems thinking and problem-solving skills. The selected challenges align closely with vocational learning outcomes in automotive engineering, manufacturing technologies, transportation systems, industrial maintenance and digital innovation.

The pilot also contributes to the development of green competences, innovation capacity and sustainability awareness, which are priorities for both vocational education and European industrial strategies.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

3.9.3 Profile and number of participants

Participants will be students enrolled in vocational education programmes at CIFP Juan de Herrera. Students may come from different years and specialisations within the centre.

Approximately 30 students will participate in the pilot.

3.9.4 Foreseen activities

Students will apply biomimicry concepts, methods and tools to design nature-inspired solutions addressing challenges connected to transportation, manufacturing, sustainability, energy efficiency and industrial innovation.

Working in multidisciplinary teams, students will follow the biomimicry process to develop solutions for selected challenges using the LET'S MIMIC Digital Learning Platform. Activities will draw directly on the Self-Regulated Learning Kit and Training Modules developed within the project.

The following LET'S MIMIC resources are particularly suitable for CIFP Juan de Herrera:

Piloting phase	LET's MIMIC resources	Example use of resources
Phase 1: Inspiration	Biomimicry Cases and Solutions	Students explore real examples of biomimicry applied to engineering, transport, manufacturing and sustainability.
Phase 2: Challenge selection	Biomimicry Challenges and Training Modules	The educator selects challenges aligned with the centre's vocational specialisations. Suggested Biomimicry Challenges ● CS21 Efficient heat dissipation in electronics inspired by nature.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

		● CS8 Wildfire prevention and early detection. ● CS9 Urban flood management systems ● CS22 Nature-inspired solutions for reducing urban heat islands. ● CS6 Sustainable light production without electricity. Suggested Training Modules ● TM04 Reflecting road studs inspired by cat eyes glow in the dark. ● TM06 The termite mounds' tunnels and building design for efficient cooling and ventilation. ● TM08 High-speed and quieter passenger trains inspired by the kingfisher, owl and penguin. ● TM10 Eco-friendly urban noise reduction inspired by nature.
Phase 3: Applying biomimicry	Biomimicry Digital Learning Platform	Students collaborate through the DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE and EVALUATE phases to develop nature-inspired solutions.
Phase 4: Feedback generation	Individual & team questionnaires	Students and educators complete evaluation questionnaires. Results will contribute to project evaluation activities and deliverable D4.4 Biomimicry Piloting Implementation.

Table 15. Piloting Case 7 structure at the CIFP Juan de Herrera, Spain.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

4. Conclusions

This report presented the pilot case setup at each of the LET's MIMIC evaluation sites in Greece, Romania, Turkey, France, Spain, and Portugal. It describes the context, participant profiles, and expected activities, acting as a guideline for the implementation of piloting for generating on-going feedback for the continuous improvement of project outcomes, include digital learning services and resources. Piloting outcomes will be described in detail in deliverable D4.4 Biomimicry pilot implementation, deployment, and evaluation.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix I – Individual evaluation questionnaire

Both students and educators can answer the following quantitative questionnaire.

Section A: Participant information

1. Country: ☐ Greece ☐ Romania ☐ Turkey ☐ France ☐ Spain ☐ Portugal
2. Institution / Program: _____
3. Role: ☐ Student ☐ Educator/Trainer ☐ Other (please specify) _____
4. Field of study / vocational area: _____

Section B: Quantitative evaluation (Likert scale)

Please rate the following statements on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Learning content and methodology

1. The biomimicry steps (DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, EVALUATE) were clear and easy to follow.
2. The content was relevant to my field of study and professional interests.
3. The activities supported my creativity and problem-solving skills.
4. I developed a better understanding of sustainability through biomimicry.

Digital platform and tools

5. The digital learning platform was easy to access and navigate.
6. The integration of digital content supported my learning process.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

7. The platform enabled effective collaboration with peers.

Resources (Self-Regulated Learning Kit, Training Modules, Educator Handbook)

8. The resources helped me manage my learning process effectively.
9. The resources supported my motivation and engagement in the activities.

Overall satisfaction

10. I am satisfied with the overall learning experience in the pilot.
11. I would recommend this learning approach to other students/educators.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix II – Team evaluation questionnaire

The following qualitative open-ended questionnaire is designed to be answered by student teams.

Relevance: Have you heard of biomimicry before? How relevant was the biomimicry content to your studies and future professional practice?

Acceptance: What was the most valuable aspect of engaging with biomimicry? How did your group receive the biomimicry approach (was it engaging, motivating, easy to adopt)?

Usability: What worked well in the Biomimicry Digital Learning Platform? What could be improved?

Quality of results: How do you assess your group's work outcomes using the biomimicry steps?

Collaboration: Did the LET's MIMIC Biomimicry Digital Learning Platform support teamwork?

Impact: What new skills, knowledge, or perspectives did you gain from this experience?

Final thoughts: What was the most valuable aspect of your engagement with biomimicry?



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix III – Questionário de Avaliação Individual - PT

Tanto os estudantes como os educadores podem responder ao seguinte questionário quantitativo.

Secção A: Informações sobre o participante

1. País: ☐ Grécia ☐ Roménia ☐ Turquia ☐ França ☐ Espanha ☐ Portugal
2. Instituição/Programa: _____
3. Função: ☐ Estudante ☐ Educador/Formador ☐ Outro (por favor, especifique)

4. Área de estudo / área profissional: _____

Secção B: Avaliação quantitativa (escala Likert)

Classifique as seguintes afirmações numa escala de 1 (Discordo totalmente) a 5 (Concordo totalmente).

Conteúdo e metodologia de aprendizagem

1. As etapas da biomimética (DEFINIR, BIOLOGIZAR, DESCOBRIR, ABSTRAIR, EMULAR, AVALIAR) foram claras e fáceis de seguir.
2. O conteúdo foi relevante para a minha área de estudo e interesses profissionais.
3. As atividades apoiaram a minha criatividade e competências de resolução de problemas.
4. Desenvolvi uma melhor compreensão da sustentabilidade através da biomimética.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Plataforma digital e Ferramentas

5. A plataforma de aprendizagem digital é fácil de aceder e navegar.
6. A integração de conteúdos digitais apoiou o meu processo de aprendizagem.
7. A plataforma permitiu uma colaboração eficaz com os colegas.

Recursos (Kit de aprendizagem autorregulada, módulos de formação, manual do educador)

8. Os recursos ajudaram-me a gerir o meu processo de aprendizagem de forma eficaz.
9. Os recursos apoiaram a minha motivação e envolvimento nas atividades.

Satisfação geral

10. Estou satisfeito/a com a experiência de aprendizagem geral no projeto-piloto.
11. Recomendaria esta abordagem de aprendizagem a outros estudantes/educadores.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix IV – Questionário de avaliação da equipa - PT

O seguinte questionário qualitativo aberto foi elaborado para ser respondido por equipas de estudantes.

Relevância: Já ouviram falar em biomimética? Qual foi a relevância do conteúdo sobre biomimética para os vossos estudos e futuro profissional?

Aceitação: Qual foi o aspeto mais importante desta experiência com a biomimética? Como é que o vosso grupo recebeu a abordagem da biomimética (foi envolvente, motivadora, fácil de adotar)?

Usabilidade: O que funcionou bem na Plataforma de Aprendizagem Digital Biomimética? O que poderia ser melhorado?

Qualidade dos resultados: Como avaliam os resultados do trabalho do vosso grupo usando as etapas da biomimética?

Colaboração: A Plataforma Digital de Aprendizagem Biomimética MIMIC da LET apoiou o trabalho em equipa?

Impacto: Que novas competências, conhecimentos ou perspetivas adquiriu com esta experiência?

Considerações finais: Qual foi o aspeto mais importante do vosso envolvimento com a biomimética?



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix V – Questionnaire individuel - FR

Section A: Informations sur le participant

1. Pays: ☐ Grèce ☐ Roumanie ☐ Turquie ☐ France ☐ Espagne ☐ Portugal
2. Institution / Programme: _____
3. Rôle: ☐ Participant / Apprenant ☐ Formateur / Encadrant ☐ Autre: _____
4. Domaine professionnel / Secteur: _____

Section B: Évaluation quantitative (échelle de Likert)

Merci d'évaluer chaque affirmation de **1 (Pas du tout d'accord)** à **5 (Tout à fait d'accord)**.

Contenu d'apprentissage et méthodologie

5. Les étapes de la biomimétique (DEFINE, BIOLOGIZE, DISCOVER, ABSTRACT, EMULATE, EVALUATE) étaient claires et faciles à suivre.
6. Le contenu était pertinent pour mon domaine professionnel et mes intérêts.
7. Les activités ont soutenu ma créativité et ma capacité à résoudre des problèmes.
8. J'ai développé une meilleure compréhension de la durabilité grâce à la biomimétique.

Plateforme numérique et outils

5. La plateforme d'apprentissage numérique était facile d'accès et de navigation.
6. L'intégration des contenus numériques a facilité mon apprentissage.
7. La plateforme a permis une collaboration efficace avec les autres participants.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Ressources (Kit d'apprentissage auto-régulé, Modules de formation, Guide du formateur)

- 8. Les ressources m'ont aidé(e) à gérer efficacement mon processus d'apprentissage.
- 9. Les ressources ont soutenu ma motivation et mon engagement dans les activités.

Satisfaction générale

- 10. Je suis satisfait(e) de mon expérience globale au sein du projet pilote.
- 11. Je recommanderais cette approche d'apprentissage à d'autres participants / formateurs.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix VI – Questionnaire Equipe - FR

Questions ouvertes à répondre collectivement.

Pertinence: Aviez-vous déjà entendu parler de la biomimétique? En quoi ce contenu est-il pertinent pour vos études ou votre futur professionnel?

Engagement: Quel aspect de la biomimétique avez-vous trouvé le plus intéressant ou utile? Était-ce motivant, facile à adopter?

Utilisabilité: Qu'est-ce qui a bien fonctionné dans la plateforme numérique de biomimétique? Qu'est-ce qui pourrait être amélioré?

Qualité des résultats: Comment évaluez-vous le travail produit par votre groupe à travers les étapes de la biomimétique?

Collaboration: La plateforme LET's MIMIC a-t-elle facilité le travail en équipe?

Impact: Quelles compétences, connaissances ou perspectives nouvelles avez-vous acquises?

Conclusion: Quel a été l'aspect le plus précieux de votre expérience avec la biomimétique?



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix VII – Chestionar de evaluare – RO

Atât elevii, cât și profesorii pot răspunde la următorul chestionar cantitativ.

Secțiunea A: Informații despre participant

1. Țara: ☐ Grecia ☐ România ☐ Turcia ☐ Franța ☐ Spania ☐ Portugalia
2. Unitatea de învățământ / Program: _____
3. Rol: ☐ Elev ☐ Profesor/Formator ☐ Altul (specificați) _____
4. Domeniu de studiu / aria vocațională: _____

Section B: Evaluare cantitativă (Scala Likert)

Vă rugăm să evaluați următoarele afirmații pe o scară de la 1 (Total dezacord) la 5 (Total acord).

Conținutul și metodologia învățării

1. Pașii biomimicriei (DEFINIRE, BIOLOGIZARE, DESCOPERIRE, ABSTRACTIZARE, SIMULARE, EVALUARE) au fost clari și ușor de urmărit.
2. Conținutul a fost relevant pentru domeniul meu de studiu și interesele profesionale.
3. Activitățile desfășurate au sprijinit dezvoltarea creativității și consolidarea competențelor de rezolvare a problemelor.
4. Am dobândit o înțelegere mai bună a sustenabilității prin biomimicrie



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Platforma digitală și instrumentele

5. Platforma digitală de învățare a fost ușor de accesat și utilizat.
6. Integrarea conținutului digital a sprijinit procesul meu de învățare.
7. Platforma a permis o colaborare eficientă cu colegii.

Resurse (Kitul de Învățare Autoreglată, Modulele de Formare, Ghidul pentru Profesori)

8. Resursele puse la dispoziție au facilitat o gestionare eficientă a procesului meu de învățare.
9. Resursele au susținut motivația mea și implicarea activă în desfășurarea activităților.

Nivelul general de satisfacție

10. Consider că experiența de învățare din cadrul pilotului a fost valoroasă și relevantă.
11. Recomand adoptarea acestei metode de învățare în contexte educaționale similar.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix VIII – Chestionar de evaluare pentru echipe - RO

Următorul chestionar calitativ cu întrebări deschise este conceput pentru a fi completat de echipele de elevi.

Relevanță: Ați auzit despre conceptul de biomimicrie înainte? Cât de relevant a fost conținutul despre biomimicrie pentru studiile și practica profesională viitoare?

Acceptare: Care a fost cel mai valoros aspect al implicării în biomimicrie? Cum a perceput grupul abordarea biomimicriei (a fost captivantă, motivantă, ușor de adoptat)?

Grad de utilizare: Ce a funcționat bine în Platforma Digitală Biomimicry LET's MIMIC? Ce ar putea fi îmbunătățit?

Calitatea rezultatelor: Cum evaluați rezultatele activității grupului folosind pașii biomimicriei?

Colaborare: A sprijinit Platforma Digitală LET's MIMIC colaborarea în echipă?

Impact: Ce competențe, cunoștințe sau perspective noi ați dobândit din această experiență?

Gânduri finale: Care a fost cel mai valoros aspect al implicării voastre în aplicarea conceptului de biomimicrie?



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix IX – Cuestionario de evaluación individual - ES

Tanto los estudiantes como los docentes pueden responder al siguiente cuestionario cuantitativo.

Sección A: Datos del participante

1. País: Grecia Rumanía Turquía Francia España Portugal
2. Institución / Programa: _____
3. Función: Estudiante Educador/Formador Otro (especificar) _____
4. Campo de estudio / área profesional: _____

Sección B: Evaluación cuantitativa (escala de Likert)

Por favor, califique las siguientes afirmaciones en una escala del 1 (Totalmente en desacuerdo) al 5 (Totalmente de acuerdo).

Contenidos y metodología de aprendizaje Plataforma y herramientas digitales Recursos (Kit de Aprendizaje Autorregulado, Módulos de Formación, Manual del Educador) Satisfacción general

1. Los pasos de la biomimética (DEFINIR, BIOLOGIZAR, DESCUBRIR, ABSTRACTAR, EMULAR, EVALUAR) eran claros y fáciles de seguir.
2. El contenido era relevante para mi campo de estudio y mis intereses profesionales.
3. Las actividades fomentaron mi creatividad y mis habilidades para la resolución de problemas.
4. Desarrollé una mejor comprensión de la sostenibilidad a través de la biomimética.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Plataforma y herramientas digitales

5. La plataforma de aprendizaje digital era fácil de acceder y navegar.
6. La integración de contenidos digitales facilitó mi proceso de aprendizaje.
7. La plataforma permitió una colaboración eficaz con mis compañeros.

Recursos (Kit de aprendizaje autorregulado, Módulos de capacitación, Manual del educador)

8. Los recursos me ayudaron a gestionar mi proceso de aprendizaje de forma eficaz.
9. Los recursos fomentaron mi motivación y mi participación en las actividades.

Satisfacción general

10. Estoy satisfecho con la experiencia de aprendizaje general en el programa piloto.
11. Recomendaría este enfoque de aprendizaje a otros estudiantes/educadores.



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix X – Cuestionario de evaluación del equipo - ES

El siguiente cuestionario cualitativo de respuesta abierta está diseñado para ser respondido por equipos de estudiantes.

Relevancia: ¿Habías oído hablar antes de la biomimética? ¿Qué relevancia tuvo el contenido sobre biomimética para tus estudios y tu futura práctica profesional?

Aceptación: ¿Cuál fue el aspecto más valioso de trabajar con la biomimética? ¿Cómo recibió tu grupo el enfoque de la biomimética (¿resultó atractivo, motivador, fácil de adoptar)?

Usabilidad: ¿Qué funcionó bien en la Plataforma de Aprendizaje Digital de Biomimética? ¿Qué se podría mejorar?

Calidad de los resultados: ¿Cómo evalúas los resultados del trabajo de tu grupo utilizando los pasos de la biomimética?

Colaboración: ¿La Plataforma de Aprendizaje Digital de Biomimética MIMIC de LET fomentó el trabajo en equipo?

Impacto: ¿Qué nuevas habilidades, conocimientos o perspectivas has adquirido con esta experiencia?

Reflexiones finales: ¿Cuál fue el aspecto más valioso de tu experiencia con la biomimética?



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix XI – Bireysel değerlendirme anketi - TR

Hem öğrenciler hem de eğitimciler aşağıdaki nicel anketi doldurabilirler.

Bölüm A: Katılımcı bilgisi

1. Ülke: ☐ Yunanistan ☐ Romanya ☐ Türkiye ☐ Fransa ☐ İspanya ☐ Portekiz
2. Kurum/ Program: _____
3. Unvan: ☐ Öğrenci ☐ Öğretmen/Eğitimci ☐ Diğer (lütfen belirtiniz) _____
4. Eğitim alanı / mesleki alan: _____

Bölüm B: Nicel değerlendirme (Likert ölçeği)

Lütfen aşağıdaki ifadeleri 1 (Kesinlikle katılmıyorum) ile 5 (Kesinlikle katılıyorum) arasında bir ölçekte değerlendirin.

Öğrenim içeriği ve yöntemleri

1. Biyomimikri adımları (TANIMLA, BİYOLOJİLEŞTİR, KEŞFET, ÖZETLE, TAKLİT ET, DEĞERLENDİR) net ve takip etmesi kolaydı.
2. İçerik, çalışma alanım ve mesleki ilgi alanlarımla ilgiliydi.
3. Bu etkinlikler yaratıcılığımı ve problem çözme becerilerimi geliştirdi.
4. Biyomimikri sayesinde sürdürülebilirlik konusunda daha iyi bir kavrayışa ulaştım.

Dijital platform ve araçlar

5. Dijital öğrenme platformuna erişim ve platformda gezinme kolaydı.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

6. Dijital içeriğin entegrasyonu öğrenme sürecime destek oldu.
7. Platform, meslektaşlarla etkili bir işbirliği yapılmasını sağladı.

Kaynaklar (Öz Düzenlemeli Öğrenme Seti, Eğitim Modülleri, Eğitimci El Kitabı)

8. Bu kaynaklar, öğrenme sürecimi verimli bir şekilde yönetmeme yardımcı oldu..
9. Bu kaynaklar, etkinliklere olan motivasyonumu ve katılımımı destekledi.

Genel memnuniyet

10. Pilot uygulamadaki genel öğrenme deneyiminden memnunum.
11. Bu öğrenme yöntemini diğer öğrencilere ve eğitimcilere tavsiye ederim.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Appendix XII – Grupla değerlendirme anketi - TR

Aşağıdaki nitel ve açık uçlu anket, öğrenci ekiplerinin yanıtlaması için hazırlanmıştır.

İlgi Düzeyi: Daha önce biyomimikriyi duymuş muydunuz? Biyomimikri içeriği, çalışmalarınız ve gelecekteki mesleki uygulamalarınızla ne kadar alakalıydı?

Kabul: Biyomimikri ile ilgilenmenin en değerli yönü neydi? Grubunuz biyomimikri yaklaşımını nasıl karşıladı (ilgi çekici, motive edici, benimsemesi kolay mıydı)?

Kullanılabilirlik: Biyomimikri Dijital Öğrenme Platformunda ne iyi işledi? Neler iyileştirilebilir?

Sonuçların kalitesi: Biyomimikri adımlarını kullanarak grubunuzun çalışma sonuçlarını nasıl değerlendiriyorsunuz?

İşbirliği: LET's MIMIC Biyomimikri Dijital Öğrenme Platformu takım çalışmasını destekledi mi?

Etki: Bu deneyimden hangi yeni becerileri, bilgileri veya bakış açılarını kazandınız?

Son düşünceler: Biyomimikri ile ilgilenmenizin en değerli yönü neydi?



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do

not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

References

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics* (5th ed.). SAGE.
- Flick, U. (2018). *An Introduction to Qualitative Research* (6th ed.). SAGE.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112.
- European Commission (2026). Centers of Vocational Excellence, on-line at [Centres of Vocational Excellence - Erasmus+](#).
- Kvale, S., & Brinkmann, S. (2015). *InterViews: Learning the Craft of Qualitative Research Interviewing* (3rd ed.). SAGE.
- Krueger, R. A., & Casey, M. A. (2015). *Focus Groups: A Practical Guide for Applied Research* (5th ed.). SAGE.
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.
- Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods* (3rd ed.). SAGE.
- Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). SAGE Publications.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2004). *Evaluation: A Systematic Approach* (7th ed.). SAGE.

Scriven, M. (1991). *Evaluation Thesaurus* (4th ed.). SAGE.

Trochim, W. M., Donnelly, J. P., & Arora, K. (2016). *Research Methods: The Essential Knowledge Base*. Cengage Learning.

Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). SAGE.



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.