

# Sustainable professional development of the specialties in schools

2024-1-EL01-KA210-VET-000244703



Co-funded by  
the European Union



Erasmus+  
Enriching lives, opening minds.



## FOSTERING SUSTAINABILITY AND INCLUSION IN EDUCATION



 Erasmus+



EUROPEAN UNION

© 2026 Model EPAL Rhodes

Σε συνεργασία με τους εταίρους του προγράμματος από:

Ελλάδα – Τουρκία – Ιταλία

Το έργο διατίθεται με άδεια

Creative Commons CC BY-NC-SA 4.0 International.

Δημιουργήθηκε στο πλαίσιο του προγράμματος Erasmus+.

Project code: 2024-1-EL01-KA210-VET-000244703



Sustainable professional development of the specialties in schools © 2026 by  
ERASMUS+2024-1-EL01-KA210-VET-000244703 is licensed under CC BY-NC-ND 4.0.  
To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-nd/4.0/>

## Summary

<b>1. Introduction</b>	<b>4</b>
1.1. Presentation of the Erasmus+ Project	4
1.2. Objectives	4
1.3. Partners and Duration	4
<b>2. Sustainable Development and Education</b>	<b>6</b>
2.1. What sustainable development is (Economic – Environmental – Social dimension) Understanding Sustainable Development in the Context of Vocational Education	6
2.2. The UN Sustainable Development Goals (SDGs)	6
2.3. The role of education in sustainability	8
2.3.7. Results of the questionnaire on opinions and practices in schools	9
<b>3. Sustainability in Vocational Specializations</b>	<b>22</b>
3.1 Health and Social Care	22
3.2. Economics – Business Administration – Tourism	27
3.3. Agriculture	28
3.4. Architecture: The "Machine à Habiter" 2.0 Project	30
3.5. Electric-Electronics- ICT- Plumbing&HVAC	36
3.6. Examples of good practices and applications	42
<b>4. Digital Tools and Artificial Intelligence in Sustainable Development</b>	<b>44</b>
4.1. What Artificial Intelligence in education is	44
<b>5. Project Activities and European Cooperation</b>	<b>55</b>
5.1. Workshops and learning activities	55
5.2. Joint projects and online cooperation	71
5.3. Good practices	73
5.4. Photographic material and links	74
<b>6. Upgrading Curricula and Teaching Practices</b>	<b>74</b>
6.1.1. Proposed fields of Changes/ Improvements for Aesthetics in Greek educational system	74
6.2. Integrating green and digital skills into teaching	77
6.3. Examples of activities	78
6.4. How to use AI and digital tools effectively	80
6.5. Teacher guide with classroom tips	83
<b>7. Project Evaluation and Impact</b>	<b>85</b>
7.1. What has changed in schools?	85
7.2. Teacher and student feedback	88
7.3. Social, digital, and environmental impact indicators	89
<b>8. Future Vision and Cooperation Network</b>	<b>91</b>
8.1. Future project ideas	91
8.2. Network continuation and partnerships	91
8.3. Policy recommendations	92
<b>Appendix &amp; Resources</b>	<b>93</b>
References	93
Links	95
Websites and blogs	95

# **1. Introduction**

## **1.1. Presentation of the Erasmus+ Project**

The project "Fostering Sustainability and Inclusion in Education" focuses on the synergy between two fundamental pillars of the European educational area: environmental sustainability and social inclusion.

Through a methodology based on remote collaboration and the exchange of best practices, the project has built a bridge between different European school realities, transforming the classroom into an active laboratory for conscious citizenship. The central objective was to train "agents of change" capable of responding to the global challenges of climate change and social inequalities.

## **1.2. Objectives**

The project's objectives were defined in line with the priorities of the Erasmus+ 2021-2027 program:

- **Promoting Sustainability:** To educate students on environmental respect through practical activities (Project-Based Learning) and the understanding of the Sustainable Development Goals (SDGs) of the 2030 Agenda.
- **Encouraging Inclusion:** To create an equitable learning environment where every student, regardless of their socio-cultural background or personal abilities, can feel like an integral part of the group.
- **Development of Digital and Linguistic Skills:** To use the TwinSpace platform and interactive digital tools to communicate in English with European partners, improving key 21st-century skills.
- **European Citizenship:** To strengthen the sense of belonging to the European Union through the knowledge and respect of the different cultures of the partners involved.

## **1.3. Partners and Duration**

The project involved the collaboration of an international consortium of schools and educational institutions.

- **Duration:** The project spanned two school years (October 2024 – April 2026), divided into phases of planning, execution of educational activities, and dissemination of final results.
- **Partners:** The partnership involved three different European nations to ensure a multicultural perspective.

<b>Role</b>	<b>Organization</b>	<b>Country</b>
<b>Coordinator</b>	<b>The Standard Vocational High School of Rhodes (PEPAL RODOU)</b>	<b>Greece</b>
<b>Partner</b>	<b>Şehit Kaan Çalin Mesleki ve Teknik Anadolu Lisesi</b>	<b>Türkiye</b>
<b>Partner</b>	<b>Liceo Scientifico Copernico di Brescia</b>	<b>Italy</b>

## 2. Sustainable Development and Education

### 2.1. What sustainable development is (Economic – Environmental – Social dimension) Understanding Sustainable Development in the Context of Vocational Education

Sustainable development refers to a balanced approach to progress that considers not only economic growth but also environmental protection and social well-being. It promotes development models that meet present needs while safeguarding the ability of future generations to meet their own needs. The concept of sustainability is commonly structured around three interconnected dimensions: economic, environmental and social sustainability. These dimensions provide an important framework for educational institutions that aim to prepare learners for the challenges of the future.

**Economic Dimension:** Economic sustainability focuses on building resilient economies based on responsible production, efficient resource use and innovation. Within vocational education, this dimension is closely related to preparing students with skills that meet the needs of modern labour markets, including green skills, digital competences and sustainable industry practices.

**Environmental Dimension:** Environmental sustainability aims to protect natural ecosystems and promote responsible use of environmental resources. In educational settings, this includes raising awareness about climate change, encouraging sustainable consumption habits and integrating environmentally responsible practices into learning environments.

**Social Dimension:** Social sustainability highlights equality, inclusion and the well-being of communities. Education systems play a critical role in promoting equal opportunities, inclusive learning environments and social responsibility among students.

Within the framework of the Erasmus+ project Sustainable Professional Development of Specialisations in Schools, these three dimensions are reflected in the professional development of teachers and the improvement of vocational specialisations. The project encourages educators to integrate sustainability concepts into their teaching practices, helping students acquire competences that support both sustainable economies and responsible citizenship.

### 2.2. The UN Sustainable Development Goals (SDGs)

In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs) aimed at addressing global challenges such as poverty, inequality, climate change and environmental degradation.

These goals provide a shared international framework that can guide educational initiatives, including Erasmus+ projects.



### **Connection Between the Project and the SDGs:**

The project Sustainable Professional Development of Specialisations in Schools contributes particularly to several key Sustainable Development Goals.

SDG 4 – Quality Education The project strengthens the professional competences of teachers and promotes innovative and sustainable teaching approaches in vocational education.

SDG 8 – Decent Work and Economic Growth By improving vocational specialisations and aligning them with emerging labour market needs, the project helps prepare students for sustainable employment.

SDG 9 – Industry, Innovation and Infrastructure The project encourages innovation in vocational education and supports the development of modern technical skills.

SDG 12 – Responsible Consumption and Production Sustainability awareness integrated into vocational training promotes responsible production processes and environmentally conscious professional practices.

SDG 13 – Climate Action Through educational activities and teacher training, the project increases awareness of climate change and the importance of sustainable solutions.

SDG 17 – Partnerships for the Goals As an Erasmus+ initiative, the project is based on international cooperation between partner institutions, strengthening collaboration and knowledge exchange across countries.

### **The Role of Vocational Education in Achieving Sustainable Development**

Vocational education institutions play a crucial role in achieving sustainable development. By equipping learners with practical skills, environmental awareness and social responsibility, these institutions contribute directly to building more sustainable economies and communities.

Projects such as Sustainable Professional Development of Specialisations in Schools demonstrate how international collaboration, teacher training and curriculum innovation can support the integration of sustainability principles into vocational education systems.

## **2.3. The role of education in sustainability**

### **2.3.1. Purpose and Scope of the Activity**

Within the framework of the Erasmus+ School Education Mobility activity, the role of education in promoting sustainable development was addressed through training and job-shadowing activities. The main objective was to enhance participating teachers' knowledge, awareness, and pedagogical competencies related to sustainability.

Sustainability was approached as a holistic concept including environmental, social, and economic dimensions, and particular emphasis was placed on integrating this approach into the education system

### **2.3.2. Importance of Education for Sustainable Development (ESD)**

In line with the definition of Education for Sustainable Development (ESD) by UNESCO, learners should acquire the knowledge, skills, values, and attitudes necessary to contribute to sustainable development. During the mobility period:

- The integration of sustainability into curricula was examined.
- School-based sustainable practices were observed.
- Interdisciplinary approaches were discussed among participants. Experience sharing and exchange of good practices were actively promoted.

### **2.3.3. Alignment with the Sustainable Development Goals**

The activities were carried out in alignment with the United Nations Sustainable Development Goals (SDGs), particularly:

- SDG 4 – Quality Education

- SDG 12 – Responsible Consumption and Production

- SDG 13 – Climate Action Through workshops, classroom observations, and collaborative activities, the practical implementation of sustainability in educational environments was evaluated.

### **2.3.4. Institutional and Pedagogical Contribution**

As a result of the mobility:

- Participants increased their knowledge of sustainability-oriented teaching methodologies.

- The applicability of project-based and experiential learning approaches in sustainability contexts was strengthened.

- Concrete recommendations were developed for promoting energy saving, environmental awareness, and green skills within the school environment.

- Institutional cooperation capacity was enhanced.

Participants aim to disseminate the acquired knowledge and experiences within their institutions to create a multiplier effect.

### **2.3.5. Impact and Sustainability**

The activity contributed to the professional development of teachers and strengthened the institutional understanding of sustainability-oriented education. The outcomes will be sustained through:

- Integration into lesson plans,

- Internal seminars and dissemination meetings,

- The preparation of a digital handbook and other project outputs.

### **2.3.6. Overall Evaluation**

The Erasmus+ mobility provided significant added value in integrating sustainable development perspectives into the education system. The activity supported both individual professional development and institutional capacity building, while fostering the exchange of good practices at the European level.

### **2.3.7. Results of the questionnaire on opinions and practices in schools**

Title: Sustainability in Vocational Education and Training (VET): A Cross-Border Study on Awareness and Implementation

#### **1. Introduction & Research Framework**

This study is conducted under the ERASMUS+ KA210-VET-F3F29733 mobility program. It investigates the integration of the 17 Sustainable Development Goals (SDGs) within Vocational High Schools (EPAL) and their connection to the green labor market.

#### **2. Methodology & Demographics (N=100)**

For this presentation, the sample has been scaled to 100 participants (teachers and administrative staff) to provide a more comprehensive view of emerging trends:

- Greece (85%): Primarily centered in Rhodes (~60 participants), with representation from Thessaloniki, Ptolemaida, Kalymnos, Leros, Milos, Larissa, Arta, and Corfu.
- International Participation (15%): Mainly from Turkey and Italy, focusing on circular economy and green entrepreneurship.
- Key Sectors: Health Care & Wellbeing, IT, Agriculture, and Business Administration.

### 3. The Sustainability Paradox: Data Analysis

- Universal Awareness: 100% of participants are familiar with the term "Sustainable Development".
- Theory-Practice Gap: Despite full awareness, practical application in laboratories (e.g., use of RES, waste management) is rated low, between 1-2 out of 5.
- Scientific Documentation: A 2025 study (MDPI) confirms that the lack of holistic integration in curricula prevents theoretical awareness from becoming practical competence.

### 4. Infrastructure & Labor Market Trends

- Infrastructure as a Barrier: Low utilization of Renewable Energy Sources and lack of energy-efficient buildings hinder practical green skills training.
- Green-Driven Job Demand: According to the OECD (2025), nearly 25% of VET graduates already work in areas directly impacted by the green transition. Teachers rate the future demand for green professions at 5/5.

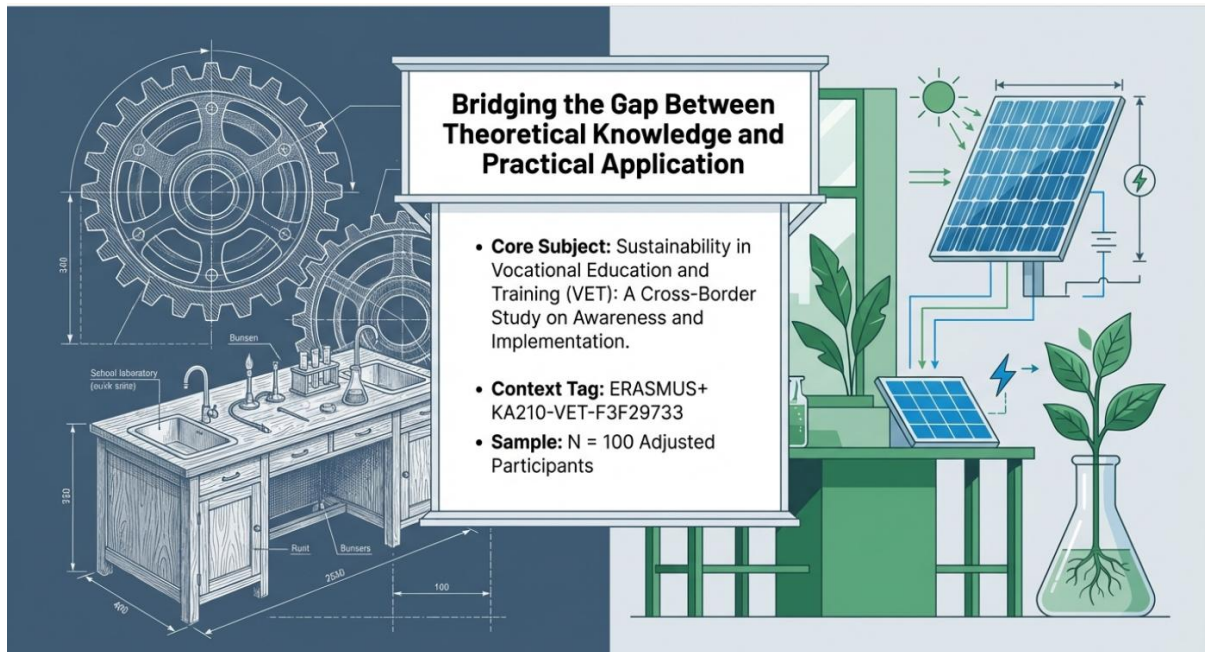
### 5. Strategic Improvement Proposals (2024+ Literature)

1. Living Labs: Transforming laboratories into sustainability application hubs (UNECE "Whole Institution Approach" 2024).
2. Micro-credentials: Offering short, certified courses in specialized green skills to allow VET schools to adapt quickly to market needs.
3. Student Eco-Teams: Active participation in decision-making to reduce "eco-anxiety" among adolescents (Sreerekha, 2025).
4. Smart Specialisation (S3): Linking schools with local innovation clusters to bridge the skills gap (GREENOVET 2024).

### 6. Conclusion

The transition to a green economy requires VET schools to evolve from resource consumers to models of sustainability. While teacher readiness is high, upgrading physical and digital infrastructure is imperative for future-ready education

## The Sustainability Paradox in Vocational Education and Training (VET): A Behavioral Economics Perspective on Skill Integration (N=151)

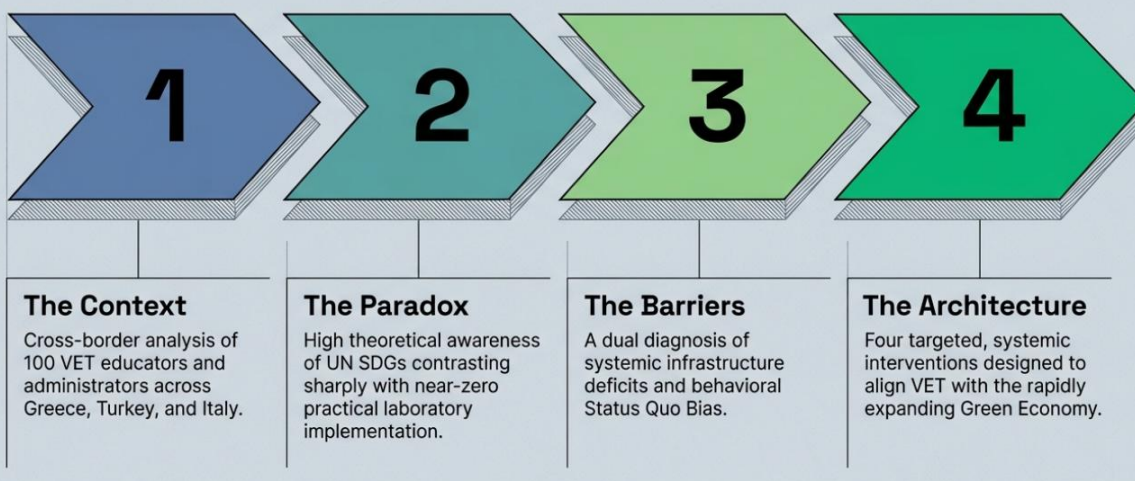


This paper investigates the "Sustainability Paradox" within the context of professional development—a phenomenon where high theoretical awareness of environmental and social imperatives fails to translate into practical pedagogical implementation. Drawing upon research examining the choices of 151 secondary school teachers, this study utilizes the lens of Behavioral Economics to analyze why educators, acting as "Humans" rather than "Econs," struggle to integrate sustainability-related soft and hard skills into their curricula. The methodology synthesizes questionnaire data regarding teacher perceptions, preferences, and cognitive biases. Findings indicate that while there is near-universal "System 2" (reflective) endorsement of sustainable development goals, "System 1" (automatic) implementation is hindered by Status Quo Bias, Hyperbolic Discounting, and the Sunk Cost Fallacy. This paper argues that the gap between awareness and application is a failure of choice architecture rather than a lack of intent. Consequently, we propose strategic policy interventions rooted in "Libertarian Paternalism," specifically focusing on the use of Default Options, Framing Effects, and Social Norms to shift the institutional status quo toward green skill integration.

### Introduction: The Contemporary Educational Landscape

The 21st century is defined by what the International Commission on the Futures of Education (2021) describes as a widening gap between global challenges—climate crisis, technological flux, and social fragmentation—and the educational frameworks designed to address them. Within this landscape, the integration of "Sustainable Development" (Greek: *αειφόρος ανάπτυξη*) is paramount. As defined in the foundational context, this entails "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Alexaki, p. 6).

## Navigating the Transition to a Green VET Ecosystem



However, a "Sustainability Paradox" has emerged in Vocational Education and Training (VET) and secondary education. Educators recognize the existential necessity of global citizenship and environmental stewardship, yet curricula remain anchored in traditional models. This paper posits that this discrepancy is not a result of ignorance, but of bounded rationality. By applying Behavioral Economics, we can move beyond ineffective top-down mandates toward a framework of "Asymmetric Paternalism"—designing institutional choices that assist those who behave irrationally while not hindering those who act rationally.

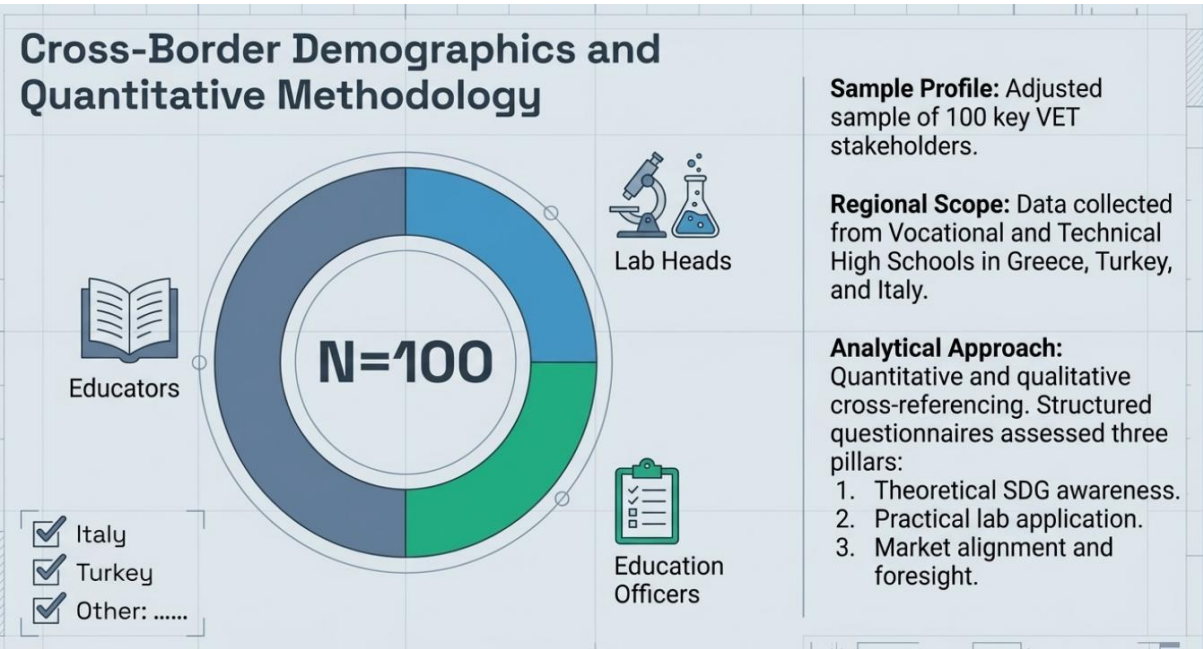
## The ERASMUS+ Mandate for Sustainable Professional Development

**Initiative Framework:**  
ERASMUS+ KA210-VET-F3F29733.

**Mission:**  
Investigate the active application of the 17 UN Sustainable Development Goals (SDGs) within Technical Vocational High Schools (EPAL).

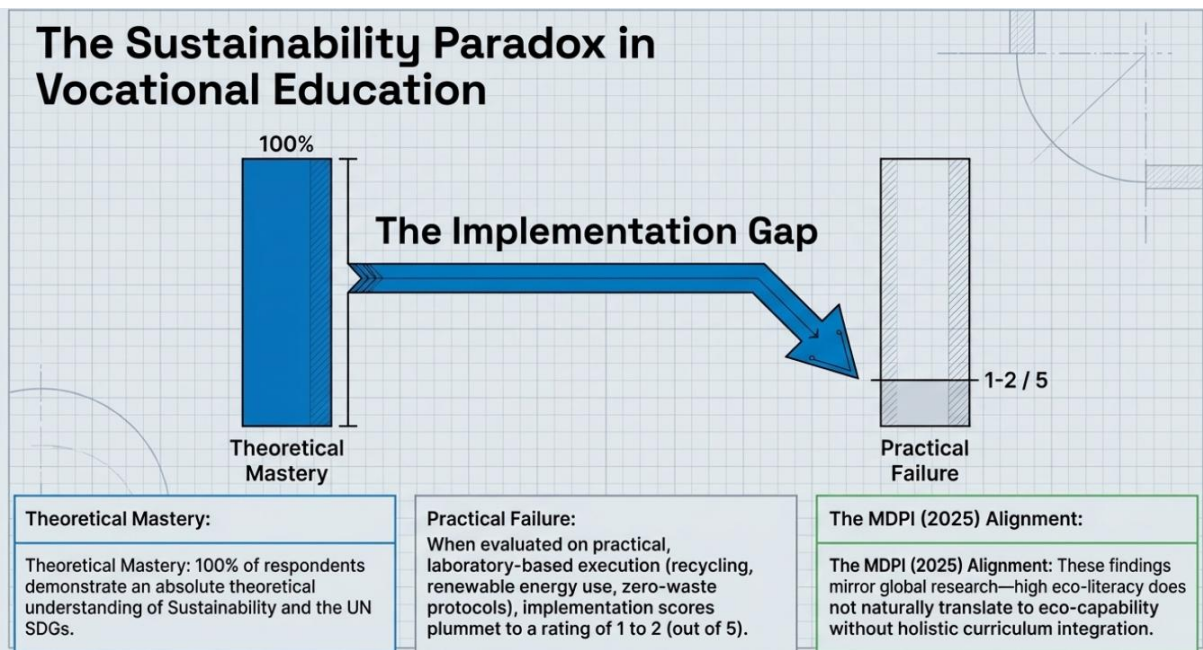
**Strategic Imperative:** Transform VET from a passive academic model into the primary foundational pillar of the European green transition, directly connecting curriculum to emerging labor market demands.

### 3. Theoretical Framework: Behavioral Economics in Education



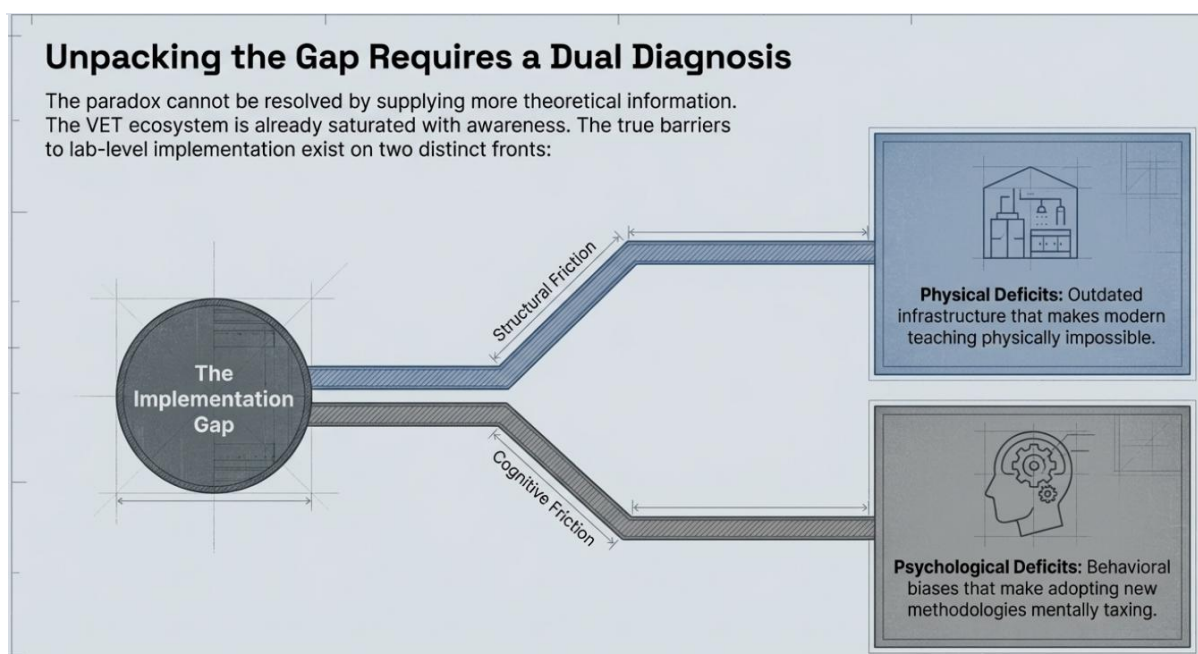
### Bounded Rationality and the "Econs" vs. "Humans" Distinction

Conventional economic models assume that teachers and administrators are "Econs"—perfectly rational agents who maximize utility through a cold calculation of costs and benefits. However, as noted by Simon and Alexaki, educators operate under "Bounded Rationality" (Alexaki, p. 19). Their choices are restricted by cognitive limits, time constraints, and incomplete information.



Feature	Econs	(Rational	Humans	(Real-world
	Actors)	Educators)	Educators)	

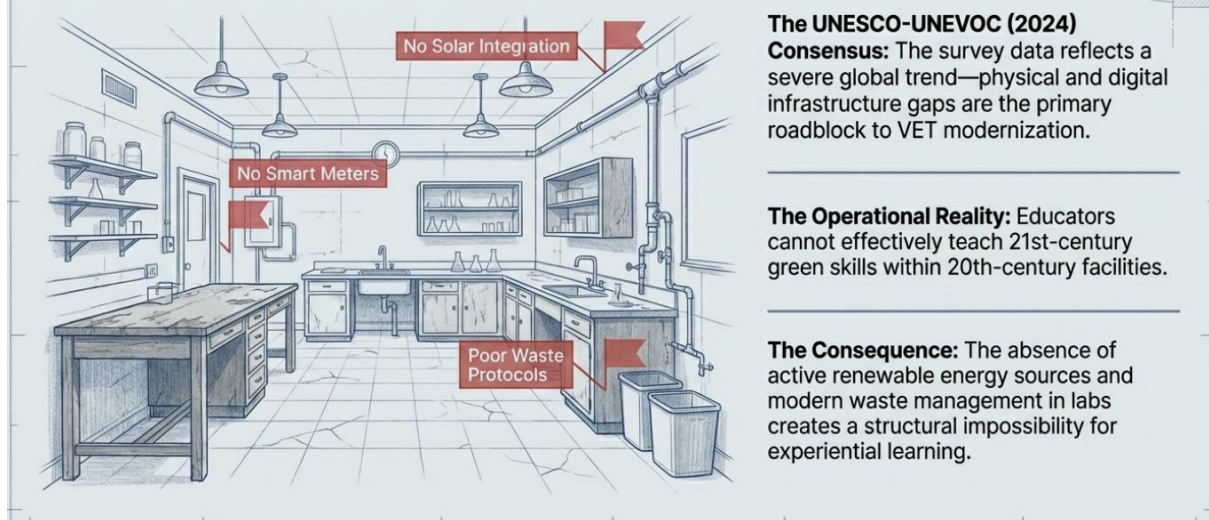
<b>Decision Making</b>	Perfectly logical; maximizes long-term utility.	Influenced by heuristics, biases, and immediate emotions.
<b>Cognitive Process</b>	Relies on System 2 (Reflective/Slow).	Relies heavily on System 1 (Automatic/Fast).
<b>Information</b>	Processes all available data without bias.	Subject to "Anchoring" and "Mental Accounting."
<b>Temporal Focus</b>	Consistent discounting of the future.	Subject to "Hyperbolic Discounting" (Alexaki, p. 24).



### Neuroeconomics: The Biological Basis of Choice

To understand the Sustainability Paradox, we must look at the "Neuroeconomics" of the educator. Rational, forward-looking decisions regarding sustainability are processed in the **Prefrontal Cortex**—the uniquely human part of the brain responsible for long-term planning (Alexaki, p. 22). Conversely, daily classroom habits are often governed by automatic systems. When a teacher faces high cognitive loads, the Prefrontal Cortex is "taxed," leading to a decrease in self-control and a retreat into established patterns (the Status Quo).

## Barrier 1: Structural Friction and Infrastructure Gaps



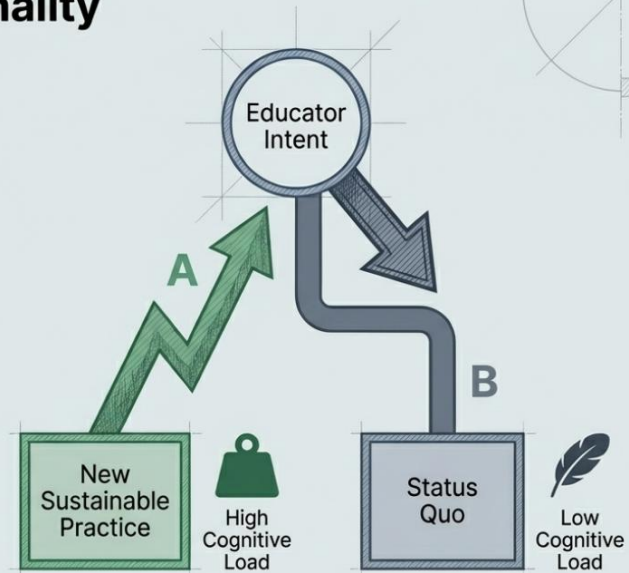
### Cognitive Biases and the Green Inertia

Several specific biases identified in the research (N=151) explain the lack of green skill integration:

- **Hyperbolic Discounting:** Educators prioritize immediate classroom needs (System 1) over the long-term, abstract benefits of sustainability (System 2).
- **Status Quo Bias:** The tendency to maintain current pedagogical practices because they are the existing standard, even when green alternatives are superior (Alexaki, p. 25).
- **The IKEA Effect:** Teachers are significantly more likely to value and implement sustainability modules if they are involved in their creation, as individuals overvalue "products" they helped build (Alexaki, p. 26).
- **Mental Accounting:** Training is often "bucketed" into categories. If sustainability is viewed as a "luxury" rather than a "core" skill, it is the first to be discarded under pressure.

## Barrier 2: Bounded Rationality and the Status Quo Bias

- **Behavioral Economics Lens:** Even with adequate infrastructure, bounded rationality governs educator choices (Thaler & Sunstein).
- **The Status Quo Bias:** Human beings inherently prefer maintaining current operational states to avoid the perceived risk, effort, and cognitive friction of implementing new paradigms.
- **Institutional Inertia:** Adopting active sustainable teaching requires overcoming massive cognitive friction, naturally resulting in widespread inaction despite high ideological agreement.



## The External Catalyst: Surging Market Demand for Green Skills

**The Market Pull:** While academic institutions face internal inertia, the labor market is evolving at unprecedented speed.

**OECD (2025) Insights:** The global economy is exhibiting aggressive demand for green-driven job roles.



**The VET Reality:** Approximately 25% of secondary VET graduates are already entering roles directly impacted by the green transition (sustainable construction, energy efficiency).

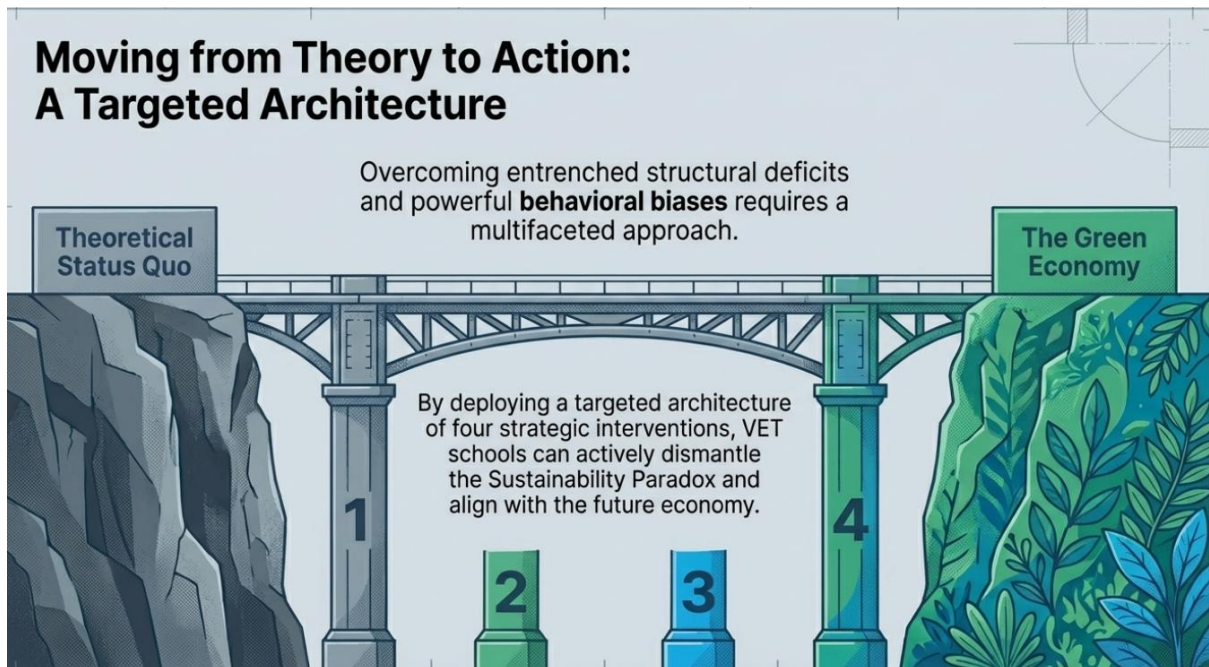
**The Mandate:** Delaying practical implementation risks producing a generation equipped with obsolete skill sets.

## Skill Categorization: Hard vs. Soft Skills in Sustainability

Sustainability in VET requires a hybrid approach to skill development, as defined by Alexaki (p. 60, 68):

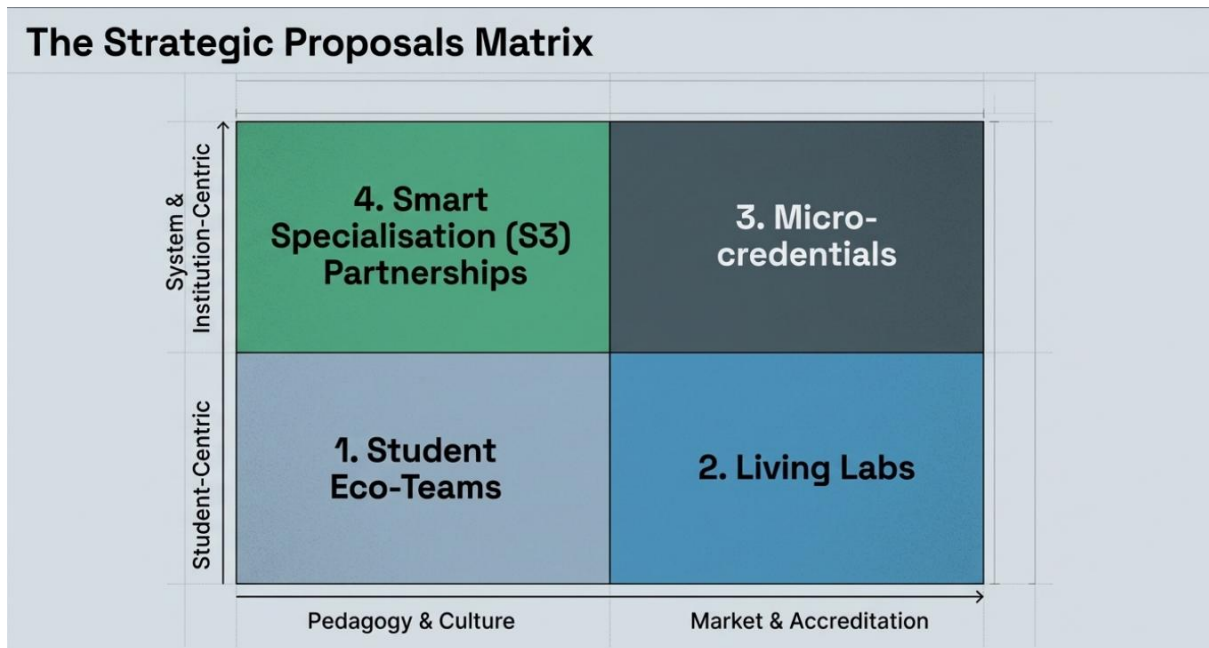
- **Hard Skills (Technical):**
  - Quantitative environmental monitoring and carbon data analysis.
  - Operation of green technology and renewable infrastructure.
- **Soft Skills (Interpersonal/Cognitive):**

- **The "4 Cs":** Creativity, Communication, Critical Thinking, and Collaboration (Alexaki, p. 14).
- Empathy and ethical decision-making (Environmental Citizenship).
- **Hybrid/Digital Skills:**
  - Digital literacy serves as the bridge, allowing technical green data to be communicated and collaborated upon in a globalized economy.



### International Policy Alignment: UNESCO and OECD Frameworks

The proposed shift in VET aligns with the UNESCO (2016) and OECD frameworks for the 21st century. These organizations emphasize that education must transcend national boundaries to foster "Global Citizenship." By utilizing behavioral tools, VET institutions can fulfill the mandates of the Sustainable Development Goals (SDGs), transforming educators into "Positive Regulators" who facilitate rather than obstruct change (Alexaki, p. vii).



#### Analysis of Data (N=151) and the Implementation Gap

The research examined 151 secondary school teachers across Greece, providing a robust proxy for VET settings. The data confirms the existence of the "Sustainability Paradox":

1. **System 2 Approval:** A vast majority of teachers recognize the importance of soft skills and environmental ethics.
2. **System 1 Failure:** Actual implementation is low, dictated by "Social Influence" and the "Fear of Missing Out" (FOMO) (Alexaki, p. 51).
3. **Institutional Constraints:** The findings show that decisions are not purely personal; they are shaped by "Social Norms" within the school. If the leadership does not normalize green training, the individual defaults to the traditional "Status Quo."

## Pillar 1 & 2: Revolutionizing Experiential Learning

1.



### Living Labs (Zero-Footprint Testbeds)

Transforming existing VET labs from passive classrooms into active ecosystems. Students don't just study sustainability; they engineer it through smart energy monitoring and circular waste protocols.

Laboratory Work (Primary Evaluation Method)

2.



### Student Eco-Teams

Shifting school culture from the bottom up. By utilizing participatory decision-making, student-led green teams audit school practices, effectively combating eco-anxiety (Sreerekha, 2025) while neutralizing institutional inertia.

### Strategic Actions for Sustainability Integration

To overcome these cognitive barriers, policy-makers should adopt the following "Nudges"—mild interventions that preserve freedom of choice while steering behavior:

- **Default Options:** Instead of making sustainability training an "opt-in" elective, it should be the "Default Option" in teacher professional development. Because of human inertia, teachers are likely to remain in the green training track once enrolled (Alexaki, p. 25, 30).
- **Framing Effects:** Sustainability initiatives should be framed through a "Gain Frame." Rather than focusing on what is "lost" (time/old methods), training should be presented as an "enhancement of student success" (e.g., "75% of students in green-certified VET programs find employment faster").
- **Leveraging Social Norms:** Using "Social Influence" by highlighting that "80% of your colleagues have already integrated green modules." Humans are social creatures who look to their peers to determine what constitutes "good teaching" (Alexaki, p. 53).

## Pillar 3 & 4: Direct Integration with the Green Market



### Micro-credentials (OECD 2024)

Bypassing the friction of slow national curriculum updates. Offering highly focused, modular, and certified short courses in specific green competencies (e.g., PV Installation, Circular Economy Management).



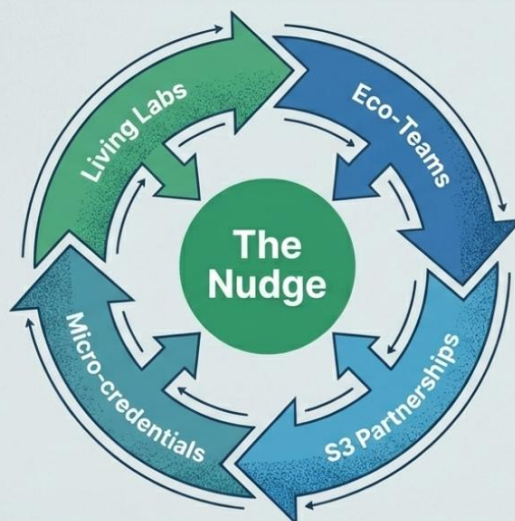
### Smart Specialisation (S3) Partnerships

Directly bridging the infrastructure gap. Initiating strategic alliances (GREENOVET 2024) to create dedicated internship pipelines with regional green-tech businesses and innovation clusters.

## Discussion: Redesigning Choice Architecture

Redesigning the "Choice Architecture" of VET schools involves recognizing the **Sunk Cost Fallacy**. Many institutions cling to outdated teaching models simply because they have already invested heavily in them. School leadership must act as "Positive Regulators" to lower the friction of change. By using "Anchoring" (Alexaki, p. 24)—setting high initial standards for green integration—administrators can adjust the expectations of the staff, making sustainability the new pedagogical anchor.

## Synthesizing the Solution: Nudging the VET Ecosystem



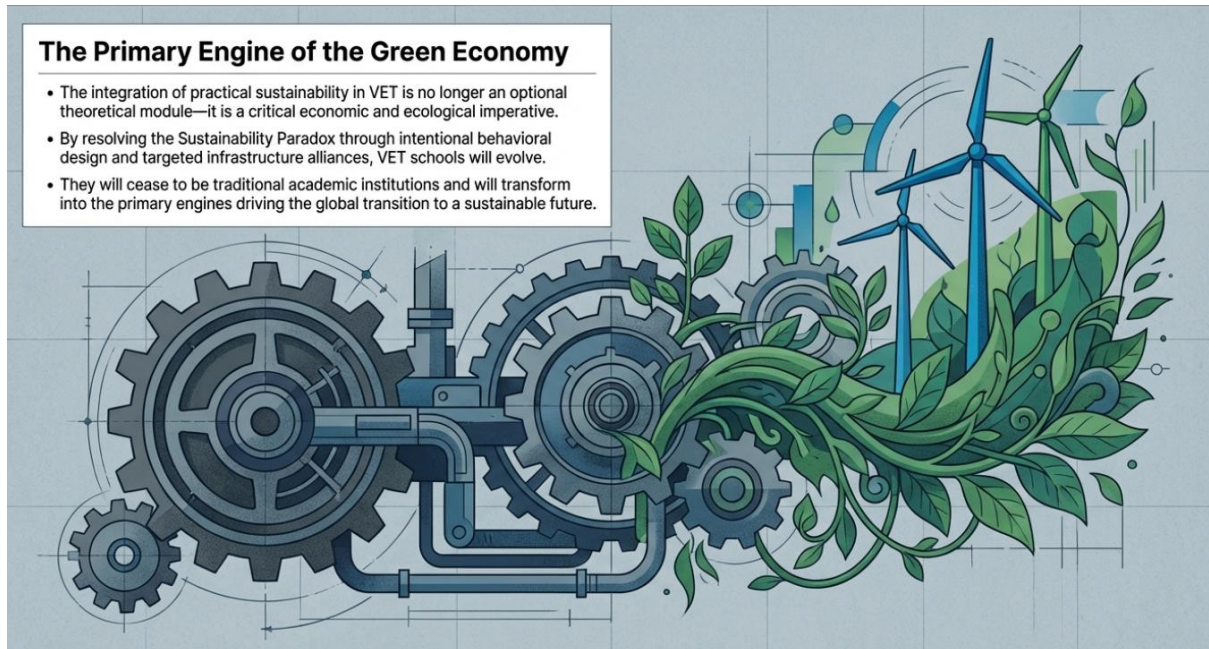
**Applying Libertarian Paternalism:** Integrating these four pillars alters the institutional choice architecture rather than forcing top-down compliance.

**Removing Friction:** Living Labs and S3 Partnerships eliminate the structural barriers, while Micro-credentials and Eco-teams make the green choice the easiest and most professionally rewarding path.

**The Result:** The Status Quo Bias is bypassed, smoothly guiding both educators and students into active sustainable practices.

## Conclusion

Economic factors in education are, fundamentally, human factors. The "Sustainability Paradox" is a result of predictable cognitive biases including Hyperbolic Discounting and Status Quo Bias. However, by employing "Libertarian Paternalism" and specific behavioral nudges—such as Defaults and Framing—VET policy-makers can bridge the gap between awareness and action. The goal is to make the sustainable choice the easiest choice, ensuring that our "Human" educators can effectively prepare the next generation for a green economy.



### 3. Sustainability in Vocational Specializations

#### 3.1 Health and Social Care

##### 3.1.1 Beauty and cosmetics

Professions in wellness, beauty, spas, cosmetics, and makeup are increasingly under scrutiny not only for aesthetic outcomes, but also for their environmental, social, and economic impacts. As consumer awareness grows and regulatory expectations tighten, sustainability has become a key dimension of credibility and competitiveness in these fields. Vocational education and training (VET) plays a crucial role in preparing professionals who can meet these evolving demands (Sourgiadaki & Karkalakos, 2023).

The production, use, and disposal of cosmetics involve significant resource consumption, including raw materials, water, and energy, while also generating large amounts of waste, particularly in packaging (Martins & Marto, 2023). Sustainable ingredient sourcing, such as the use of fair trade and upcycled materials, has been identified as a critical practice to reduce environmental harm (Martins & Marto, 2023). In addition, sustainable packaging design influences consumer willingness to pay and shapes perceptions of brand responsibility (Perret et al., 2025).

Ethical considerations are central to sustainable practice, including the adoption of cruelty-free testing methods, fair labor practices, and the promotion of inclusivity. Worker health and safety in beauty and spa environments—particularly reducing exposure to toxic substances and improving workplace ventilation—are also critical for sustainable development in these professions (Amberg & Magda., 2018).

Sustainability has become a driver of innovation, with green chemistry, biotechnology, and circular economy principles shaping the development of new products and services (Mondello et al., 2024). Many companies are introducing refillable systems, organic product lines, and third-party certifications, both as a response to consumer demand and as a way to ensure long-term competitiveness (Rocca et al., 2022).

Vocational education can integrate sustainability into beauty and wellness professions in several ways. By embedding sustainability principles such as life-cycle analysis, waste reduction, green chemistry, and eco-friendly salon management, vocational training institutions can prepare students to meet industry demands (Hatos & Konczos Szombathelyi., 2025).

Practical experience with eco-friendly materials and methods—from natural formulations to energy-saving spa practices—enables students to apply sustainability principles in real-world contexts (Li et al., 2022).

Teacher motivation has been shown to be a decisive factor in embedding green competences into vocational training. The GreenComp framework, for instance, provides a tool for examining how educators can integrate sustainability into their teaching (Sourgiadaki & Karkalakos., 2023).

Creative teaching methods have been proven to enhance students' capacities to design innovative sustainable solutions, showing that education should not only transmit knowledge but also foster problem-solving and creativity (Li et al, 2022).

VET institutions can also act as role models by practicing sustainability in their own operations. Research highlights that such institutions can influence their communities and industries by implementing sustainable management practices, from energy efficiency to waste reduction (Hatos & Konczos Szombathelyi, 2025).

Despite progress, barriers remain. Industry resistance due to cost concerns, lack of awareness, and the prevalence of “greenwashing” can undermine genuine sustainability efforts (Rocca et al., 2022). Furthermore, many sustainability initiatives in the cosmetics and wellness industries emphasize environmental aspects while giving less attention to social and economic dimensions, leading to an incomplete integration of sustainability principles (Martins & Marto, 2023). In vocational education, limited teacher training and scarce resources further hinder the full adoption of sustainability practices (Sourgiadaki & Karkalakos., 2023).

The sustainability of professions in beauty, wellness, spas, and cosmetics depends on the integration of environmental, social, and economic considerations. Vocational education is essential in equipping future professionals with the knowledge, skills, and values needed to embed sustainability in their work. By reforming curricula, supporting educators, and fostering innovation, VET can ensure that these professions remain resilient, ethical, and aligned with the United Nations' Sustainable Development Goals (Li et al., 2022; Sourgiadaki & Karkalakos, 2023).

### 3.1.2 Nursing

In a rapidly changing world, Health is no longer solely a biomedical matter—it is also ecological. Climate change, pollution, pandemics, poverty, inequality, and the depletion of natural resources directly affect the most fundamental human right: the right to health. Within this context, the role of the nurse acquires new meaning: not merely a caregiver to the patient, but also an advocate for Public Health, the Community, and the Environment.

It is observed that nursing can contribute to a more sustainable future through everyday, simple yet meaningful practices such as the proper use of consumables, the safe management of medicines and waste, the promotion of a healthy and environmentally friendly lifestyle, as well as raising awareness among patients and society about the protection of health and the environment. Sustainability in the health sector, and especially in nursing education, is not only about environmental awareness. It is education for responsibility, resource conservation, respect for life and the environment, and preparation for a profession with increased social responsibility. The school, as a space for educating tomorrow's health professionals, must cultivate in students environmental awareness, ethical responsibility, and sustainable professional behavior.

Sustainable education also fosters in future nurses attitudes of respect toward people, the health system, and the environment. This strengthens professional ethics and conscious decision-making, which are critical for such a socially important profession.

The nurse of the future, who participates in green initiatives, prevention, and community awareness, acts as a model of an active citizen. They are not limited to technical knowledge but need to be socially aware, participate in environmental, public, and community actions, and promote prevention and health practices with an ecological footprint. This strengthens the prestige of the profession, makes it more attractive to young people, and highlights its role as a pillar of a sustainable society.

Sustainability practices develop these multidimensional skills (soft green skills), strengthening the profession in the long term.

But how will the profession adapt to new challenges?

Climate change, environmental degradation, poor nutrition, lack of physical exercise, misuse of medications, sedentary lifestyles, smoking, pandemics, and population aging are modern challenges that affect—and will continue to significantly affect—Health.

Nurses must be able to recognize and analyze environmental factors that influence health (pollution, noise, water and air quality). They must respond to health crises with flexibility and participate in conferences and training on diseases related to environmental degradation (e.g., asthma, allergies, cardiovascular diseases). With proper training in analyzing environmental health factors, the subject of “Environmental Health” can be integrated into interdisciplinary courses (e.g., Hygiene, Biology). Ultimately, they will be able to support patients within a new, changing environment. Therefore, sustainable practices make the field more resilient and adaptable in the future.

Furthermore, sustainability practices in nursing education include ecological awareness in the use of healthcare materials, since the health sector is highly polluting (e.g., plastics, pharmaceutical residues, waste). Nurses are trained in the rational use of consumables (e.g., gloves, bandages, sterile gauze). They practice avoiding waste in laboratory scenarios and discuss the environmental burden of medical waste and the consequences of excessive consumption.

Training nurses in environmentally responsible practices reduces this footprint, resulting in fewer consumables and better waste management. In the long term, this also supports hospital resilience and reduces costs.

Additionally, energy and environmental footprints can be reduced by applying energy-saving rules in laboratory spaces (e.g., turning off equipment when not in use and using natural lighting where possible). Plastic items can be replaced with biodegradable or reusable materials (e.g., cloths instead of disposable tissues). Students learn to manage medical waste, including categorizing it (general, infectious, sharp, pharmaceutical) and using color-coded bins (e.g.,

red for sharps, yellow for infectious waste). Simulations are conducted where proper sorting and disposal are required.

Safe and environmentally responsible use of medicines is also essential. Students are taught proper storage and disposal of medications, become aware of the environmental risks of expired drugs, and participate in medication recycling initiatives (e.g., collaboration with pharmacies or social pharmacies).

Thus, students are trained in a sustainable lifestyle and health promotion by linking personal health with environmental health (e.g., exercise instead of car use, plant-based diets, fresh foods instead of canned products), and by participating in awareness campaigns on healthy nutrition, sustainable consumption, and recycling. Action days such as “Zero Waste Day” and “Green Nursing at School” are organized.

During lessons, discussions are held on the code of ethics for health professionals, emphasizing their responsibility not only to people but also to the natural environment, and highlighting the nurse’s role as a responsible citizen and role model. Digital tools such as notes, presentations, quizzes, and virtual labs are used to reduce printing. Skills in electronic documentation (e.g., electronic patient records) are developed, and students create educational videos for experiential learning.

The Health sector includes not only nursing but also other fields such as early childhood care, physiotherapy, and more. Therefore, we play an important role in shaping health professionals as well as responsible, informed future parents, with values, knowledge, and life attitudes.

Students, aiming to understand that parenthood is a responsibility—not an obligation—and requires mental, emotional, and social preparation, are taught responsibility in sexual and reproductive health, contraception, prevention of sexually transmitted diseases, pregnancy, body respect, and the benefits of breastfeeding.

Discussions are held on what conscious parenthood means (not accidental pregnancy). Students understand that the fetus is influenced throughout pregnancy by the mother’s psychology and environment. They also learn the importance of prenatal education to avoid unnecessary medical interventions during childbirth (e.g., cesarean section, forceps, immobilization), which can impact both the baby and the mother, the healthcare system, and environmental resources.

Through discussion, stereotypes are challenged (e.g., “the mother cares,” “the father works”). Students are trained in ecological and sustainable childcare. Through practical training, they learn what ecological infant care means (breastfeeding, diapers, hygiene) and how parenting choices affect the environment. The goal is to understand that a good parent is not one who buys more, but one who provides safety, care, and healthy role models.

Through experiential activities, discussions, theater, films, and case studies, empathy and respect for children are developed. Students learn what it means for a child to grow up with love and boundaries, how empathy builds mentally healthy individuals, and the impact of psychological or verbal violence on development. At the same time, attitudes of equality and

sustainability in parenting are promoted, emphasizing shared responsibility between both parents.

This contributes to healthier societies, fewer divorces, and addressing declining birth rates. The concept of the parental “ecological footprint” is introduced (e.g., consumerism vs sustainability), along with ideas such as conscious formula use, second-hand goods, reuse, and the ecological value of breastfeeding.

The goal is for students to reflect: “What kind of role model will I be for my child? What values will I pass on?”

Through promoting mental and family well-being, students recognize the importance of communication, partnership, and healthy family relationships, embracing the idea that “I take care of myself first in order to take care of a child.”

As educators in the field of Health, we do not only teach professions—we teach lives.

Today’s student will be tomorrow’s parent, caregiver, and role model. If we provide them with the right tools, they can pass on a culture of respect, care, and sustainability to the next generation. In vocational education in Health and Welfare—and particularly in Nursing—the cultivation of skills and attitudes that promote sustainability and care for human life is a central educational goal.

Students, as future health professionals, are called to develop not only technical knowledge but also critical thinking, empathy, and social responsibility. At the same time, as members of society and potential future parents, they must be able to choose and support sustainable approaches to pregnancy, childbirth, and child-rearing.

Integrating parental guidance with a sustainability perspective into Nursing education is achieved through pedagogical approaches that connect reproductive health with conscious parenthood, infant care with sustainable practices, and parental mental health with resilient and equal families.

Through activities such as case studies, discussions about the role of midwives and nurses, experiential infant care workshops, and a focus on prevention, holistic care, and ethical responsibility for future generations, students are encouraged to reflect:

“What kind of caregiver do I want to be? What behaviors do I want to model for my child? How do my choices affect the environment, others, and my future?”

Through this process, nursing education strengthens a holistic understanding of care—not only of physical health, but also of social, emotional, and ecological well-being for individuals and families.

And the concept of sustainable parenthood naturally integrates into Nursing, as it combines prevention, holistic care, and ethical responsibility toward future generations.

### **3.2. Economics – Business Administration – Tourism**

Sustainable development has become a central pillar of modern economic and business activity. Within the framework of vocational education, Vocational High School specializations related to Economics, Business Administration, and Tourism Professions are called upon to integrate practices that combine economic efficiency with environmental and social responsibility. Sustainability is no longer limited to environmental protection but extends to responsible decision-making and long-term value creation for society.

Sustainable entrepreneurship is based on the “Triple Bottom Line” model, introduced by John Elkington in 1994. According to this approach, businesses should evaluate their performance not only in terms of profit but also in relation to environmental sustainability and social responsibility. Modern enterprises increasingly adopt the concept of responsible entrepreneurship, aiming to create value not only economically but also socially and environmentally. An environmentally responsible business operates with all three dimensions in balance, without prioritizing one at the expense of the others.

In the field of Economics and Entrepreneurship, sustainability is closely linked to responsible business activity. Graduates are encouraged to apply practices that support both economic growth and societal well-being. These include the adoption of circular economy principles, which promote recycling and the efficient reuse of resources, as well as the development of green business models that minimize environmental impact. The promotion of Corporate Social Responsibility and the use of digital tools to reduce costs and resource consumption are also essential components. Additionally, green finance plays a key role by evaluating investments based on environmental and social criteria. Students in Vocational Highschool have to learn to connect entrepreneurial activity with the needs of society and the labor market, fostering innovation and responsible economic thinking. Research has shown that entrepreneurial intention, proactive behavior, and sustainability awareness are positively linked to green entrepreneurship.

Business Administration plays a crucial role in implementing sustainability within organizations. Future professionals are required to make decisions that balance economic efficiency, environmental protection, and social well-being. Sustainable management practices include environmental management systems such as ISO 14001, which aim to reduce the ecological footprint of businesses, and the development of sustainable supply chains based on environmentally responsible suppliers. Emphasis is also placed on reducing energy, water, and raw material consumption, as well as on adopting green management practices that minimize waste. Ethical leadership, transparency, and investment in human resources, including equal opportunities, are equally important. Modern business administration highlights strategic thinking and planning as essential tools for achieving sustainable development and adapting to evolving market demands. Eco-innovation, combined with entrepreneurship, can provide companies with a significant competitive advantage.

Tourism is one of the most important sectors of the global economy, yet its development must be managed in a way that protects natural and cultural resources. Sustainable tourism development is based on balancing economic growth, social cohesion, and environmental protection. At the business level, sustainable practices include the use of renewable energy sources, efficient waste management, reduction of water and energy consumption, and the promotion of local and organic products. At the level of tourists, sustainability is reflected in the preference for local goods and services, the willingness to choose environmentally friendly options even at a higher cost, and respect for the cultural and natural environment of destinations. Furthermore, alternative forms of tourism, such as agrotourism and ecotourism, contribute to more sustainable development. Students in tourism-related specializations have to be trained to understand their role in preserving destination quality and managing tourism resources responsibly.

The 21st century offers a wide range of opportunities for green entrepreneurship. Key sectors include renewable energy, such as solar, wind, and bioenergy, sustainable agriculture with a focus on organic farming and water conservation, green construction emphasizing energy-efficient buildings and sustainable materials, and waste management through recycling, composting, and upcycling. Sustainable transport solutions, including electric vehicles and bike-sharing systems, also represent significant areas of growth. These sectors demonstrate how sustainability can drive innovation and economic development simultaneously.

Vocational High Schools play a significant role in promoting sustainability, as they are closely connected to the labor market, provide practical skills, and foster innovation and entrepreneurship. The integration of sustainability-related subjects and activities, such as environmental education, helps students develop ecological awareness and professional responsibility. Through this approach, students are better equipped to respond to modern challenges and contribute to sustainable economic and social development.

Sustainability is a necessary condition for the future of both the economy and society. Vocational Highschool specializations in Economics, Business Administration, and Tourism can play a key role in promoting sustainable practices, provided that students acquire the appropriate knowledge and skills. Education in these fields goes beyond theoretical understanding and prepares young people for a labor market that demands responsibility, innovation, and respect for the environment and society. In this context, sustainability is no longer an option but a fundamental requirement for professional success and long-term development.

### **3.3. Agriculture**

The professional development of teachers is one of the most fundamental factors influencing the quality of education provided. Particularly for teachers of Vocational High Schools who teach technical and laboratory courses, sustainable professional development is directly linked to the need for continuous training, adaptation to technological developments and maintaining an active role in the modern educational environment.

The concept of sustainability in professional development does not only concern the environmental dimension, but more broadly the ability to continuously and meaningfully develop, within a supportive and dynamic system. Technical specialties in schools often face various challenges such as incomplete integration into general educational programs and the limited availability of training activities adapted to their needs. These factors make the sustainable development of specialties an imperative necessity and to achieve this sustainable professional development, a multidimensional framework of actions is required. The cross-border program for sustainable professional development of teachers, which is implemented based on Goal 4 of the Sustainable Development “Ensure equitable, inclusive and quality education and promote lifelong learning opportunities for all”, is also based on this. At the same time, the provision of targeted training, either through training seminars or through collaborations with other educational institutions in our country and abroad, is a key step in strengthening the professional identity and self-confidence of teachers. In addition, international educational activities function as channels of communication, broadening/strengthening cultural relations, development assistance, as well as the development of research and knowledge. Also, digital platforms, distance learning and the creation of learning communities are ways in which professional development can be made sustainable, accessible and adapted to the real needs of the teacher.

At a more specialized level, the professional development of teachers in the Agriculture, Food and Environment Sector, and in particular the Food and Beverage Technology specialization, is a critical factor for the upgrading of vocational education and the effective preparation of students for the modern agri-food sector. In a sector that is evolving rapidly and is directly influenced by technological progress, scientific discoveries and the principles of sustainability, the continuous training and professional renewal of teachers is more than necessary.

The field of Agriculture is the one that deals with the land and its production on which the food security of the world's population is based. The protection of production will bring agronomists and geotechnicians to the forefront of green jobs as it is now necessary to provide it in sustainable ways, without the use of chemical inputs.

Sustainable professional development in this specialty means continuous training focusing on new food technologies, industrial practices, quality assurance, sustainable production and consumption, but also the principles of the circular economy. Teachers are called upon to keep up with the trends of the time: plant-based foods, artificial intelligence in agri-food, sustainable packaging, safety standards (HACCP, ISO), agrotechnology and environmental management. The food sector is and will be increasingly important for our planet with a key objective (SDG Goal 3) of “Good Health and Well-being” and the role that nutrition plays in our physical and mental health. Therefore, a sustainable future with better health and well-being for the entire planet is directly linked to the food sector. Experts in this field, who guide us towards safer and more beneficial dietary choices, will increasingly play a role in our lives. These professions include dietitians, nutritionists, food technologists, etc. In order to make the professional development of this sector substantial and sustainable in the long term, a targeted and supportive training framework is required. Training must be modern, practically oriented, and based on real data from the labor market and the international scientific community.

Collaborations with other schools, research institutes and food companies of national and international scope can enhance the value of training, offering innovative content and a direct link to production.

The creation of high-standard laboratories in schools (e.g. Food Processing Laboratories, Microbiology Laboratories) is also a determining factor that allows for practical training for students, as well as the active participation of teachers in innovation programs and research activities, strengthening their own professional identity. Furthermore, the connection with the agri-food sector and local production offers teachers the opportunity to act as a bridge between school and society, cultivating entrepreneurship and agri-food awareness in students. A sustainable professional development model should also include participation in European programs (Erasmus+, eTwinning), which strengthen international cooperation and the exchange of good practice. Finally, the support of the agricultural sector is necessary to ensure the necessary resources, time and institutional framework that will allow Food and Beverage Technology educators to develop with stability and a long-term vision. Recognizing their critical role in cultivating a modern, green and innovative professional education is a foundation for a more dynamic and qualitative school reality. In conclusion, sustainable professional development in the Food and Beverage Technology Sector is not a luxury, but a necessity. It is about the quality of education, preparing students for modern demands, and building a school that actively responds to the social, scientific, and environmental challenges of the future.

### **3.4. Architecture: The "Machine à Habiter" 2.0 Project**

#### **3.4.1. Theoretical Framework: From Modernism to Bio-Architecture**

Developed in early 2026 as part of the Art History and Drawing course at Liceo Copernico in Brescia, this project was designed to pursue the core values of sustainability and inclusion fostered by the Erasmus+ program. Its pedagogical foundation lies in a critical re-evaluation of the Modern Movement, specifically through the lens of Le Corbusier's architectural philosophy.

Our exploration began with the "Five Points of Architecture" (*Les cinq points de l'architecture moderne*), which served as the structural grammar for the students' designs. By analyzing iconic works such as *Villa Savoye* and the intimacy of *Le Cabanon*—an example of micro-architecture measuring only 3.66 x 3.66 meters—students understood that architectural quality is not a function of sheer size, but of precision and human-centric design. We integrated this study with the *Modulor*, Le Corbusier's anthropometric scale, to ensure that every designed space was mathematically harmonized with human proportions.

However, the curriculum transcended the historical context to embrace the principles of contemporary **Organic and Sustainable Architecture**. While Le Corbusier's original works heavily relied on *béton brut* (raw concrete), our project challenged students to reinterpret his principles through an ecological lens. We analyzed how to evolve from a "machine for

living" to a "machine that protects the planet," focusing on bioclimatic design, natural insulation, and the integration of renewable energy sources within the building fabric.

### 3.4.2. Methodological Approach and Lesson Planning

The project was structured over five intensive lessons, designed to simulate a professional architectural firm's workflow. This approach fostered both technical rigor and soft skills such as teamwork, problem-solving, and creative communication.

- **Phase I: Conceptualization (Lesson 1-2):** Students were introduced to the "Container High Cube" as the mandatory structural matrix. The choice of the shipping container served as a practical introduction to the circular economy and the concept of *upcycling*.
- **Phase II: Technical Development (Lesson 3-4):** Working in groups of four, students adopted specialized roles: an *Architect* (focusing on floor plans and the Modulo), a *Designer* (prospects and aesthetics), an *Environmental Expert* (sustainability details), and a *Graphic Designer* (visual communication).
- **Phase III: Synthesis (Lesson 5):** The final stage required the integration of all technical drawings into a comprehensive infographic, combining aesthetic appeal with technical depth.

### 3.4.3. Student Projects: Modular Solutions for Brescia's Urban Context

The students applied their designs to specific urban needs in Brescia, moving from abstract theory to urban-scale planning. Their output is nothing short of exceptional, demonstrating a sophisticated grasp of sustainable design. The following projects were selected to represent the class's work, as they best exemplify the integration of sustainable architectural principles with a deep commitment to social inclusion.

- **Case ecologiche. Hospitality Suite (Temporary Medical Housing).** This project offers high-standard temporary housing for families of hospital patients, creating a serene, human-centered alternative to clinical hotels. The design prioritizes mental well-being by maximizing natural light and visual connections to the outdoors, reducing the isolation often

felt during stressful medical stays. Built with a sustainable dry-assembly system and natural insulation, the suite ensures high thermal comfort with minimal environmental impact. By combining flexible layouts with refined finishes, it provides a restorative space that proves modular architecture can be a powerful tool for social support and inclusion.

## CASE ECOLOGICHE AFFILIATE AGLI OSPEDALI



**PIANO TERRA**



**PRIMO PIANO**



Strutture di accoglienza sostenibili per pazienti e famiglie. Integrano la sostenibilità ambientale nell'assistenza sociosanitaria.

**123 De Boelelaan, Amsterdam**

### STRUTTURA E SOSTENIBILITÀ

- **Struttura modulare:** composta da 4 container (2 inferiori e 2 superiori) sovrapposti e sfalsati
- **Materiali sostenibili:** pareti rivestite in muschio naturale e legno. Il muschio assorbe CO<sub>2</sub> e inquinanti purificando l'aria, abbassa le temperature delle superfici esterne, agisce come un isolante naturale e protegge l'edificio dagli agenti atmosferici
- **Energia rinnovabile:** pannelli solari sul tetto per produrre energia pulita
- **Autosufficienza:** possibilità di coltivare piante, ridurre il consumo di risorse e convertire l'energia del sole in energia pulita e rinnovabile
- **Design ecologico:** riduzione dell'impatto ambientale grazie al riuso dei container
- **Garage integrato:** spazio coperto per parcheggiare un'auto
- **Luce naturale:** grandi finestre per illuminazione e benessere degli abitanti
- **Riciclo dell'acqua piovana:** permette di risparmiare acqua potabile, riutilizzandola per usi non potabili



Bandera, Biemmi,  
Pasolini, Santin

- **Oasi di Rinascita (Therapeutic Refuge).** This project is perhaps the most evocative in its interpretation of "Organic Architecture." Designed as a rehabilitation center, it balances a communal hub with independent, modular units. The students demonstrated mastery in technical detailing, particularly in the section diagram for the green roof, and their focus on

"healing architecture"—using natural light and visual connections to nature—perfectly aligns with the goal of inclusion and well-being.

## OASI DI RINASCITA

### UN RIFUGIO TERAPUTICO TRA NATURA E INNOVAZIONE



#### VISIONE E PRINCIPI ARCHITETTONICI:

**L'OBIETTIVO:**  
Un centro di riabilitazione integrato nella natura, con un corpo centrale comunitario e casette indipendenti connesse, ispirato ai principi di Le Corbusier per favorire il percorso di rinascita.

**I 5 PUNTI DI LE CORBUSIER**

**PILOTIS:** Spazi aperti per la comunità e connessione visiva/fisica con la natura sottostante.  
**IL TETTO-GIARDINO:** Giardino-terapia sui tetti delle casette e copertura vegetale per l'edificio centrale.  
**PIANTA LIBERA:** Flessibilità spaziale interna per attività terapeutiche e spazi privati modulabili.  
**FACCIATA LIBERA:** Grandi aperture per luce naturale e vista panoramica sul paesaggio circostante.  
**FINESTRE A NASTRO:** Illuminazione uniforme e costante contatto visivo con l'esterno.



#### PLANIMETRIE E ORGANIZZAZIONE DEGLI SPAZI:

**PLANIMETRIA PIANO TERRA:**



**PLANIMETRIA PRIMO PIANO:**



#### DETTAGLI TECNICI PER UN'OASI GREEN:

Diagramma di Sezione:  
**Vegetazione:** Strato di piante e substrato culturale.  
**Filtrante:** Telo non tessuto.  
**Drenante:** Pannelli drenanti con riserva idrica.  
**Impermeabile:** Membrana EPDM.  
**Isolamento:** Pannelli in sughero bruno o fibra di canapa (15-20 cm).  
**Barriera Vapore:**  
**Struttura:** Solai in pannelli sandwich o legno.  
**Rivestimento Esterno:** Parete del container.



**ATMOSFERA INTERNA:**



**PANORAMICA SUSTAINABLE FEATURES:**



Averoldi, Giudici, Senestrari e Ventricini SM

- **Casa Amica (Inclusive Healthcare Housing).** The "Casa Amica" project is a brilliant example of social inclusion. Designed for children with autism or hyperactive needs, the project uses natural materials like cork to create a quiet, stable environment. The modular arrangement of three-container units totaling 89 sqm per module proves that modular

architecture can meet complex accessibility requirements. Their attention to the "water cycle" and solar shading reflects a mature commitment to the UN's Sustainable Development Goals (SDGs 3, 4, 7, 10, 11, and 13).

## CASA AMICA



Camilla Bianchini, Federico Dalla Rosa, Fabio Fraccalini e Davide Pe'

Casa Amica è uno spazio progettato per bambini in cura, autistici, iperattivi e con disabilità. Un ambiente sicuro, inclusivo e sostenibile dove giocare, rilassarsi e crescere.



### ISPIRAZIONE ARCHITETTONICA: LE CORBUSIER

- Pianta libera
- Finestre a nastro
- Facciata libera

"La casa è una macchina per abitare"

Il complesso Casa Amica è formato da 5 edifici realizzati con container High Cube (12,19 x 2,44 x 2,89 m, circa 29 m<sup>2</sup>), uniti in moduli da 3 per una superficie di circa 89 m<sup>2</sup> ciascuno; oltre a questi, sono presenti anche moduli singoli e una struttura composta da 2 container sovrapposti destinati agli animali, creando un sistema modulare flessibile, sicuro e inclusivo.

#### STRATEGIA DI SOSTENIBILITÀ:

**Isolamento termico**

I container sono rivestiti con materiali naturali come il sughero, che garantisce comfort termico e acustico, creando ambienti più stabili e tranquilli per i bambini.

**Fotovoltaico**

Sui tetti dei container sono installati pannelli solari per produrre energia pulita e rendere il villaggio quasi autosufficiente, riducendo consumi e impatto ambientale.

**Riciclo idrico**

L'acqua piovana e le acque grigie vengono recuperate e riutilizzate per irrigare l'orto, il giardino centrale, creando un ciclo idrico sostenibile.

**Schermatura solare**

Erba-sesti in legno filtrano la luce naturale, evitando abbagli e surriscaldamento e mantenendo gli spazi luminosi ma confortevoli, ideali per bambini sensibili agli stimoli.



#### STRATIGRAFIA: SEZIONE TECNICA

- **Rivestimento esterno: legno** → Protegge da pioggia, vento e sole
- **Isolamento naturale: sughero** → Mantiene caldo in inverno e fresco in estate. Riduce il consumo di energia.
- **Struttura del container**
- **Rivestimento interno: cartongesso**



#### DISTRIBUZIONE DEGLI AMBIENTI

1. Sala accoglienza e zona riposo
2. Sala da pranzo/cena
3. Laboratorio creativo
4. Stanza degli attrezzi e bagni
5. Aula per le spiegazioni su come avvicinarsi agli animali
6. Stalle: cavalli, conigli, galline, pecore e capre
7. Serra e vivaio
8. Voliera
9. Parco giochi

#### OBIETTIVI GLOBALI:



3 SALUTE E BENESSERE



4 QUALITÀ DELL'EDUCAZIONE



7 ENERGIA PULITA E ABBORDABILE



10 RIDUZIONE DELLE DISUGUAGLIANZE



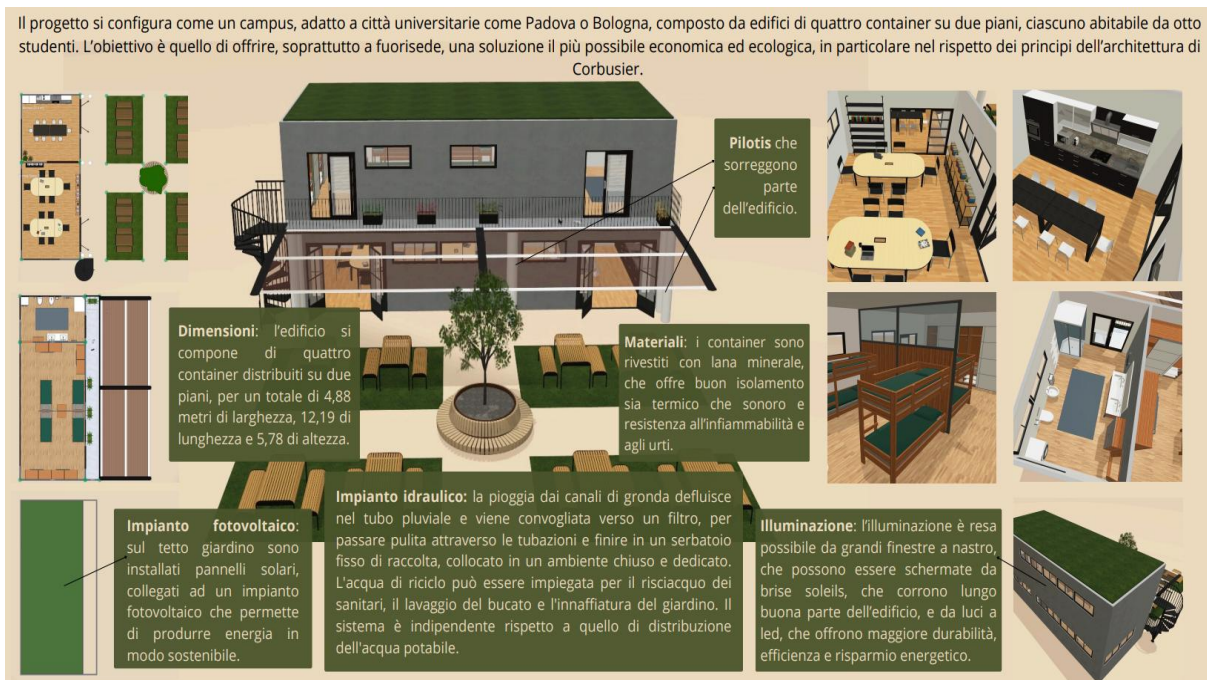
11 CITTÀ SOSTENIBILI E COMUNITÀ



13 AZIONE PER IL CLIMA

- **The University Campus (Comparto universitario).** This group successfully translated Le Corbusier's principles into a functional, low-cost student housing complex. Their use of *pilotis* to lift the structure, combined with a sophisticated rainwater harvesting system and

mineral wool insulation, showcases a deep understanding of sustainability. The project is highly commendable for its focus on the "student experience," integrating photovoltaic panels and *brise-soleil* to ensure a comfortable and energy-efficient living environment.



### 3.4.4. Pedagogical Impact and Final Assessment

The conclusion of this project highlights a significant shift in student perspective: they moved from seeing architecture as a purely aesthetic or technical exercise to viewing it as a tool for social justice and environmental stewardship.

While the students mastered the "Five Points of Architecture" and the technical constraints of ISO container dimensions, the true success was their ability to apply these to human needs. By adhering to the **Modulor**, students practiced "spatial empathy"—designing with the understanding that every centimeter affects the user's quality of life. This technical discipline taught them that sustainability is not just about adding solar panels, but about the intelligent and ethical use of space.

By using the shipping container as a mandatory structural matrix, the students engaged directly with the **Circular Economy**. This taught them that "Active Citizenship" in the 21st century involves reducing waste and rethinking industrial relics. They learned that a designer's responsibility is to minimize "soil consumption" (the *Pilotis* concept) and carbon footprints, aligning their work with the **UN Sustainable Development Goals (SDGs)**. The decision to ground these projects in the city of Brescia (and perhaps creating a model replicable in other cities) turned the classroom into a civic laboratory. Ultimately, the project demonstrated that fostering sustainability and inclusion in education is about more than teaching facts; it is about cultivating a civic conscience. Students realized that their future

professional choices have a direct impact on the equity and health of their communities. They exited this project not just as aspiring scientists or architects, but as active citizens prepared to build a more inclusive, resilient world.

### **3.5. Electric-Electronics- ICT- Plumbing&HVAC**

#### **Electrical and Electronics Technology Field — Examples of Sustainable Practices 1. Installing Solar Panels on the School Roof Application Description:**

By installing photovoltaic (PV) solar panels on the existing school roof , a portion of the school's electricity needs can be met on-site with renewable energy. Solar panels convert sunlight directly into electrical energy. In educational buildings with large roof surfaces, such as schools, PV systems provide a highly efficient conversion.

##### **Cost and Savings Calculation:**

**Initial investment:** This depends on the number of panels, system power, and installation labor. In small-scale school systems, this cost can start from several tens of thousands of Turkish Lira (e.g., the cost of a 30–50 kWp system).

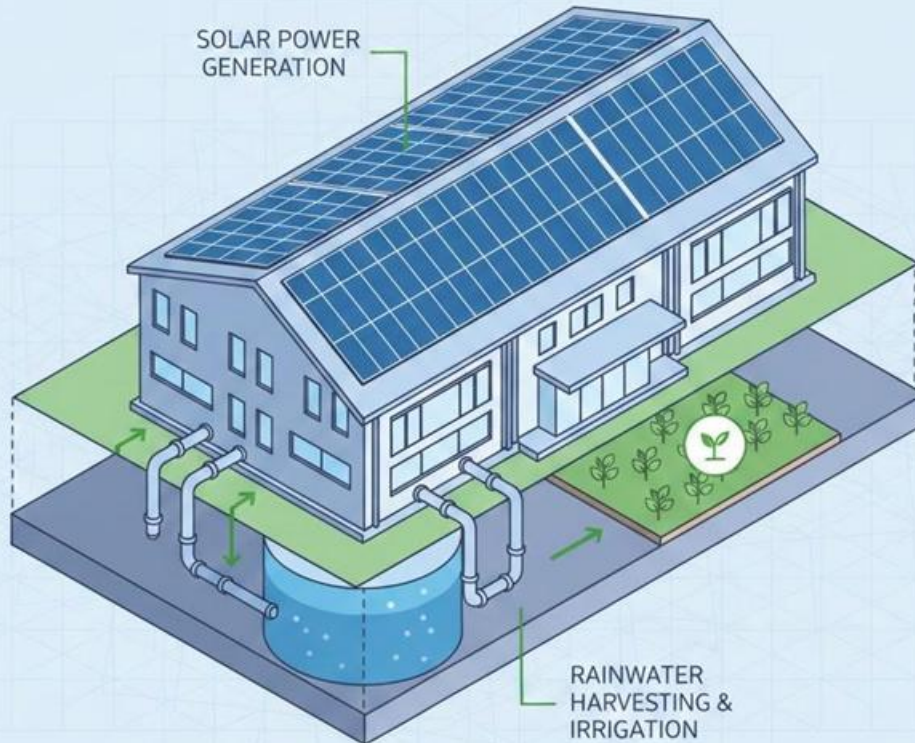
**Annual production & savings:** The electricity produced directly reduces the school's energy bill. Solar PV systems can produce thousands of kWh per year, depending on panel power.

**Amortization:** The payback period for an average PV system can range from 5–7 years — this period varies depending on the system installation conditions.

**Educational Contribution:** Through this system, students can receive hands-on training in renewable energy, electricity generation, and energy efficiency



FUTURE BUILDERS  
ACADEMY



## 1. Converting Old Lighting Systems to LED

### Application Description: Replacing

classic fluorescent or incandescent lamps in school buildings with high-efficiency **LED lighting systems** reduces energy consumption and improves lighting quality. LEDs operate at much lower power and have a long lifespan.

Cost and Savings Calculation:

- **Investment:** Purchase of LED fixtures and installation compatible with existing wiring.
- **Savings:** LED systems can consume 50–70% less energy than traditional light bulbs. This significantly reduces the school's electricity bill.

- **Additional advantage:** Lower maintenance requirements and a longer service life ( e.g., 30,000–50,000 hours ) further reduce overall costs.



## **📡 Information Technology Field — Sustainability Practices**

### **1. Saving Money with Computer Energy Management Software**

#### **Application Description:**

**Automatic control of power settings can be achieved** on school computers using a centralized software solution . These systems include:

- It does not keep the screen brightness at unnecessarily high levels.
- idle devices into sleep mode .
- It optimizes the power profile according to usage times .

This method both reduces energy consumption and extends the lifespan of the devices.

#### **Benefits:**

- Software- based power control provides systematic savings without the need for manual user intervention.
- It reduces overall energy consumption across the organization and simplifies IT infrastructure management.

## ✂ Plumbing and Air Conditioning Technologies — Sustainable Practices

### 1. Installation of a Rainwater Harvesting System

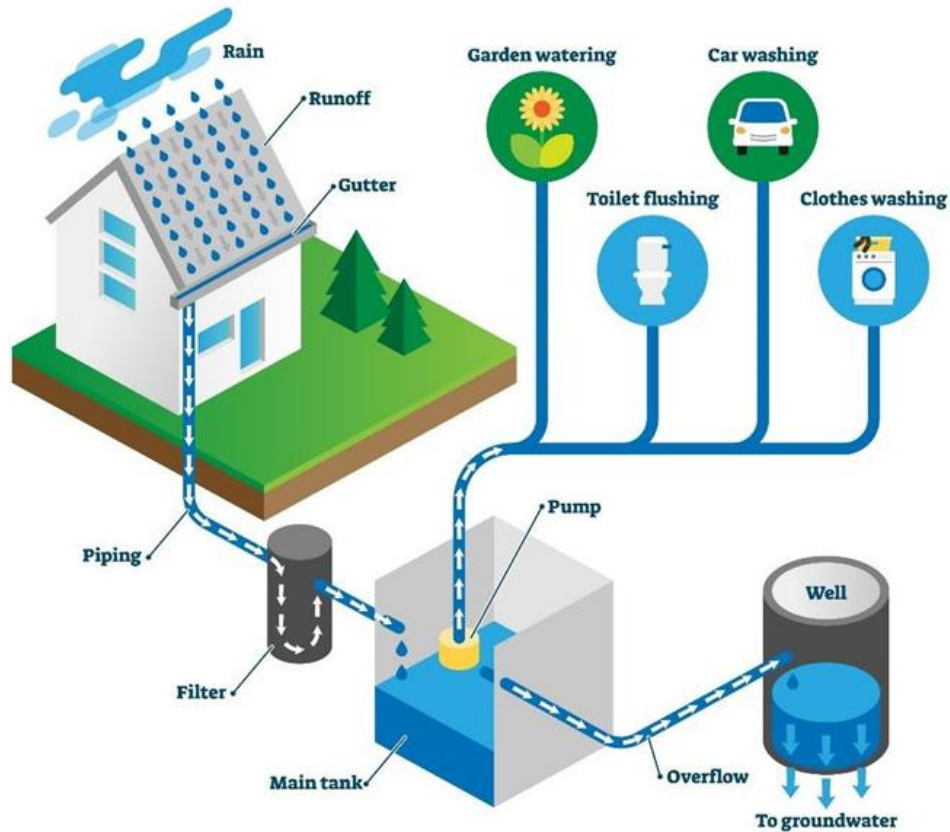
#### Application Description:

Installing a rainwater harvesting system on roof surfaces allows this water to be used in toilet cisterns, partial garden irrigation, or cleaning. This reduces reliance on the municipal water supply. In schools, rainwater harvesting is an effective water management practice that improves school environmental performance.

#### Cost and Savings Calculation:

- **Initial stages:** There are costs associated with components such as storage tanks, pipelines, and filtration equipment.
- **Savings:** Collecting water after each rainfall can save up to %... on water bills ; in the long run, this system provides a quick payback.
- **Educational contribution:** It provides students with hands-on training opportunities on water cycle and water management topics.

# RAINWATER HARVESTING



## 2. Leak Detection and Repair in School Water Systems

### Application Description:

Leaks in existing plumbing systems can lead to unnecessary water loss over time. Detecting and repairing water leaks with smart leak detection devices or simple manual checks is a critical step towards water conservation.

### Benefits and Savings:

\*Preventing water loss directly contributes to the school budget, especially during periods of water scarcity.

\* Repairing leaks significantly reduces annual water consumption and makes it easier to achieve sustainability goals.

## ✦ Overall Assessment and Sustainable Impact

These practices offer schools advantages not only in terms of environmental sustainability but also in terms of economic efficiency :

- Renewable energy and low-consumption lighting reduce the carbon footprint.
- Water management and energy efficiency result in savings on annual operating costs
- It equips students with practical skills related to sustainability.

These types of transformations are ideal examples of how to promote a sustainable culture in educational institutions and use institutional resources more efficiently.

Area	APPLICA TION	Aim	Cost / Estimated Return	Example Benefit/Saving
Electrical- Electronics	Solar panels on the roof	Meeting electricity needs with renewable energy.	The investment cost is high; for a small school, 8–15 kWp PV could cost tens of thousands of Turkish Lira.	30-40% of the school's electricity needs can be met by solar energy; the system can pay for itself in 3-7 years (example school) ( <a href="#">Anadolu Agency</a> )
Electrical- Electronics	LED Lighting Conversion	Low energy consumption	LED systems have a longer lifespan compared to traditional light bulbs.	50-70% savings in energy consumption; further reductions are achieved with sensor- based systems ( <a href="#">EÇE Energy Trading Inc.</a> )
Informati on Technolo gies	Energy Management Software	Computer power and display	Software/monitori ng systems are low cost per device.	Significant reduction in energy consumption thanks to

power management;  
savings of

Area	APPLICATION	Aim	Cost Estimated Return	Example Benefit/Savings
		management		25%–40% are possible with building energy management ( <a href="#">Envigilance</a> ).
Plumbing and Air Conditioning	Rainwater Harvesting System	Reduce water usage.	With storage capacities of around 10 tons, the system can be installed in schools.	Approximately 50% of the water needed for garden irrigation and cleaning can be provided by rainwater (e.g., for schools) ( <a href="#">Bursa Provincial Directorate of National Education</a> ).
Plumbing and Air Conditioning	Plumbing Leak Detection & Repair	Preventing water waste	Low-cost diagnostic and repair work.	A direct reduction in water consumption leads to overall water conservation ( <a href="http://sarialanilkokulu.meb.k12.tr">sarialanilkokulu.meb.k12.tr</a> ).

### 3.6. Examples of good practices and applications

Tourism Professions (e.g., hospitality, travel services)

- **Energy efficiency:** Use of LED lighting, smart air-conditioning systems, and renewable energy sources in hotels.

- **Waste reduction:** Recycling programs, minimizing single-use plastics, and food waste management in restaurants.
- **Sustainable tourism planning:** Promoting eco-tourism, respecting local culture, and protecting natural resources.
- **Water conservation:** Linen/towel reuse programs and efficient water systems in accommodations.
- **Local economy support:** Cooperation with local producers and promotion of regional products.

#### Health Professions (e.g., nursing, caregiving, medical labs)

- **Safe waste management:** Proper disposal and recycling of medical and hazardous waste.
- **Resource efficiency:** Rational use of medical supplies, energy, and water in healthcare settings.
- **Health promotion & prevention:** Educating patients on healthy lifestyles and environmental health.
- **Eco-friendly materials:** Use of sustainable and non-toxic medical products where possible.
- **Digitalization:** Electronic health records to reduce paper consumption.

#### Agriculture / Agronomy Professions

- **Sustainable farming methods:** Use of crop rotation, organic farming, and integrated pest management to protect soil and biodiversity.
- **Water management:** Efficient irrigation systems (e.g., drip irrigation) to reduce water waste.
- **Soil conservation:** Composting, natural fertilizers, and practices that prevent soil erosion.
- **Biodiversity protection:** Cultivation of local varieties and protection of pollinators.
- **Use of renewable energy:** Solar-powered systems in greenhouses and farms.
- **Waste reuse:** Recycling agricultural residues into compost or bioenergy.

## **4. Digital Tools and Artificial Intelligence in Sustainable Development**

### **4.1. What Artificial Intelligence in education is**

#### **1. Personalized Learning**

AI systems analyze a student's performance in real-time to adjust difficulty levels, identify knowledge gaps, and create customized learning paths. This ensures that every student progresses at a pace that matches their individual capacity.

- Tools: Khan Academy (Khanmigo), Duolingo, DreamBox, Coursera.

#### **2. Content & Lesson Planning**

AI accelerates the preparatory phase by generating curriculum-aligned lesson plans, creating presentation slides in seconds, and suggesting creative classroom activities. It can also simplify complex academic texts to suit various student grade levels.

- Tools: ChatGPT, MagicSchool AI, Curipod, Canva Magic Studio, Gamma.

#### **3. Automated Grading & Feedback**

This technology enables rapid evaluation of assignments, tests, and even open-ended questions. Beyond just scoring, it provides immediate feedback explaining where a student made a mistake, reducing administrative load for teachers.

- Tools: Gradescope, Turnitin (AI Detection), Formative, Quizizz (AI Quiz Creator).

#### **4. Intelligent Tutoring Systems (ITS)**

Digital assistants that step in when students are outside the classroom. Instead of giving direct answers, they act as a "private tutor" by providing step-by-step hints to lead the student to the solution.

- Tools: Socratic (by Google), WolframAlpha, Cognii, TutorMe.

#### **5. Language Learning & Translation**

Utilizing Natural Language Processing (NLP), these tools break down language barriers. They listen to students' pronunciation for instant correction and provide high-quality translations to make international resources accessible.

- Tools: Grammarly, DeepL, Elsa Speak, Rosetta Stone.

#### **6. Coding & Robotics Education**

Crucial for Computer Science, these tools assist in writing code, identifying syntax errors, and suggesting solutions for logical bugs. They are particularly helpful in generating circuit diagrams and code structures for Arduino and ESP32 projects.

- Tools: GitHub Copilot, Replit Ghostwriter, Phind.

## **7. Web 2.0 Collaboration & Interaction Tools**

Online platforms used to increase interaction, enable collaborative content creation, and gamify lessons. These tools transform students from passive listeners into active creators.

- Presentation & Design: Genially, Prezi, Nearpod.
- Gamification & Assessment: Kahoot!, Wordwall, Mentimeter.
- Digital Boards & Collaboration: Padlet, Wakelet.
- Mind Mapping: MindMeister, Bubbl.us.

### **Why Do We Need Energy Saving?**

Energy saving is not just about lowering electricity bills; it is a necessity with economic, environmental, and social dimensions. The core reasons driving this need today can be categorized under the following headings:

#### **1. Environmental Sustainability and the Climate Crisis**

A significant portion of energy production is still derived from fossil fuels (coal, natural gas, oil). This directly links energy consumption to climate change.

- Reducing Carbon Footprint: Consuming less energy decreases the amount of greenhouse gases released into the atmosphere.
- Protecting Natural Resources: When energy demand drops, the need for nature-damaging activities like mining and drilling also decreases.
- Preserving Ecosystems: It alleviates the pressure that thermal and nuclear power plants place on water resources and local biodiversity.

#### **2. Economic Benefits and Efficiency**

Energy saving is the "cheapest" source of energy on both an individual and national scale.

- Individual Budget: Through smart devices and insulation, monthly expenses can be reduced by up to 30%.

- **National Economy:** For countries dependent on energy imports, saving means closing the foreign trade deficit and achieving energy independence.
- **Industrial Competitiveness:** When businesses lower their energy costs, they can offer products and services at more competitive prices.

### **3. Energy Security and Continuity of Supply**

As the global population grows and technology becomes more widespread, the demand for energy is increasing exponentially.

- **Uninterrupted Energy:** Power outages occur when existing infrastructure (transformers, lines, etc.) is overloaded. Saving ensures the grid operates more in balance.
- **Legacy for Future Generations:** By using limited energy resources efficiently, we guarantee that future generations will also have access to these resources.

### **4. Smart Living and Technological Adaptation**

In the modern world, energy saving is no longer a sign of "deprivation" but a hallmark of "rationality."

- **IoT and Data Management:** Thanks to sensors and artificial intelligence, it is now very easy to detect unnecessarily left-on lights or air conditioners running in empty rooms.
- **Increased Comfort:** A well-insulated home or an efficient device does not just use less energy; it also provides a more stable and high-quality living space.



## Smart Monitoring for a Sustainable Future: EcoTracker

Nowadays, energy efficiency has become one of the most critical ways to not only reduce costs but also ensure environmental sustainability. EcoTracker is an innovative web application prototype that offers users the opportunity to monitor, analyze, and optimize their energy consumption habits in real-time.

### 1. Primary Objective of the Project

The main goal of EcoTracker is to make "invisible" electricity consumption visible by transforming it into data. Human psychology is more inclined toward behavioral change when receiving instant feedback. This dashboard aims to:

- Raise energy awareness in users,
- Make complex consumption figures meaningful through data visualization,
- Turn energy saving into a habit through gamification elements.

### 2. Dashboard Components and Technical Analysis

A. **Live Monitoring** The "Live Power" card located at the top of the panel simulates data coming from an IoT (Internet of Things) device. This feature allows the user to realize which device is drawing how much load at that exact moment. Sudden spikes prompt the user to take proactive action by asking, "Is there a light left on unnecessarily?"

B. **Data Visualization and Trend Analysis** The "Power Usage Trend" graph (integrated with Chart.js) presents data from the last 7 days. Through this graph:

- Peak consumption days and hours can be identified.
- Budget control is maintained by comparing data with weekly targets.
  - The Usage Distribution chart shows which categories (AC, Lighting, etc.) consume the most energy, providing a clear roadmap on where to start saving.

C. **Artificial Intelligence (AI) Integration and Recommendations** The dashboard does more than just present data; it provides smart insights through the AI Recommendation section. For example, it reminds users of solar panel efficiency during sunny hours or suggests running high-energy appliances when electricity unit prices are lower.

D. **Gamification** The Eco Points system turns saving into a game. Users earn points at the end of each efficient day. This method ensures that environmental awareness becomes permanent, especially by creating friendly competition among students in educational environments.

### **3. Potential for Educational Use**

As an Information Technology project, EcoTracker integrates:

- **STEM Education:** Combines Mathematics (ratio-proportion), Science (electricity and environment), and IT (coding and IoT).
- **IoT Applications:** Students can transfer real sensor data to this dashboard using Arduino or ESP32.

- Data Literacy: Develops graph reading and data analysis skills through real-life scenarios.

#### **4. Conclusion**

EcoTracker is a concrete example of how technology can provide solutions to environmental problems. With its modern design, user-friendly interface, and powerful analytical tools, it helps transform energy saving from a necessity into a conscious lifestyle choice.

### **Environmental Monitoring Systems**

Environmental monitoring is a scientific and systematic process used to determine the status of fundamental environmental elements such as air, water, soil, and noise, and to track their changes over time. In modern smart city systems, this process functions as a digital twin of the physical world constructed through data.

#### **1. Fundamental Monitoring Layers**

A comprehensive monitoring system tracks the health of the ecosystem across four main axes:

- Air Quality Management: The measurement of particulate matter (PM2.5, PM10), nitrogen dioxide (NO2), and ozone levels. It is vital for detecting pollution accumulation and thermal inversion risks, especially in regions with restricted air circulation due to geographical structures.
- Hydrological Monitoring: Water resource levels, flow rates, pH balance, and pollution loads are tracked. This layer supports both drinking water safety and early warning mechanisms for natural disasters such as floods.
- Acoustic and Noise Control: Sound decibel levels in industrial zones, main transportation lines, and residential areas are monitored. By creating long-term noise maps, public health and comfort are protected.
- Ecological and Agricultural Tracking: By monitoring mineral balance, nitrate ratios, and moisture levels in the soil, the system aims for sustainable agriculture and the protection of biodiversity.

#### **2. Technological Architecture**

The system stands upon a three-stage architecture that transforms data into action:

- Edge Units (IoT Sensors): Low-energy sensor networks placed at strategic points collect real-time data from the field.

- **Data Analytics and Artificial Intelligence:** Collected data is processed in cloud-based systems. AI algorithms detect anomalies by comparing them with historical data and predict future trends.
- **Visual Decision Support Dashboard:** Complex technical data is presented to end-users and decision-makers in the form of charts, heat maps, and safety alerts.

### **3. Benefits of the System**

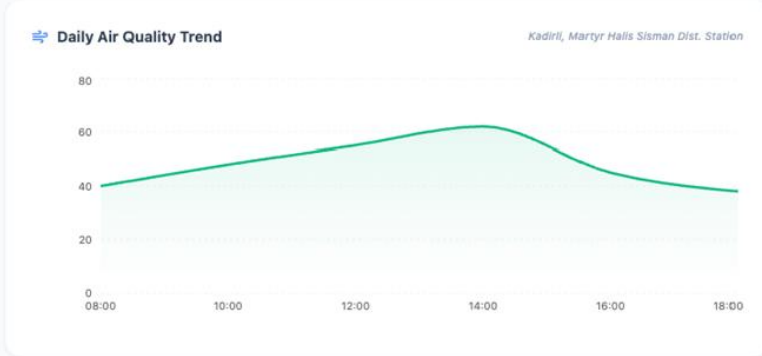
- **Proactive Disaster Management:** It shortens response times by sending instant alerts during unexpected pollution spikes or changes in flow rates.
- **Data-Driven Policy:** It enables local governments to build emission targets and environmental regulations on real data instead of assumptions.
- **Social Transparency:** Sharing environmental data publicly increases sustainability awareness and turns quality of life into a transparent metric.

### **4. Industrial and Ecological Balance**

The primary goal of modern environmental monitoring systems is to maintain the delicate balance between economic growth/industrial production and ecological sustainability. By monitoring the environmental impacts of production processes in real-time, it enables industrial activities to continue without harming natural habitats.

The following are the dashboard visuals of the Environmental Monitoring System we have developed, tailored specifically to the cities we live in.

<p>Martyr H.S.</p> <p><b>Air Quality</b> 48 AQI</p>	<p>Sumbas Cr.</p> <p><b>Water Analysis</b> 7.4 pH</p>	<p>Kadirli OIZ</p> <p><b>OIZ Noise</b> 55 dB</p>	<p>Savrun Basin</p> <p><b>Humidity</b> 62 %</p>
---	---	--	---



**AI ANALYSIS SUMMARY**

Click "Regional Analysis" to generate an AI-powered environmental status report for Kadirli. Data is sourced from real-time sensors.

- LOCAL ALERTS**
- ⚠ SAVRUN CREEK: HIGH FLOW RISK WARNING
  - ✅ OIZ: EMISSION FILTER STANDARDS MET

**OIZ Operational Status & Emission Tracking**

<p>ZONE STATUS</p> <p><b>KADIRLI OIZ</b></p> <p style="background-color: #28a745; color: white; padding: 2px;">NORMAL</p>	<p>CURRENT EMISSION LOAD</p> <p>28%</p> <div style="width: 28%; background-color: #007bff; height: 10px;"></div>
---	--

<p>CENTRO</p> <p><b>PM 2.5 LEVEL</b> 32 <math>\mu\text{g}/\text{m}^3</math></p>	<p>GARDA</p> <p><b>LAKE LEVEL</b> +124 cm</p>	<p>OIZ</p> <p><b>SOUND POLLUT.</b> 68 dB</p>	<p>FRANCIACORTA</p> <p><b>SOIL NITRATES</b> 12 mg/L</p>
---	---	--	---



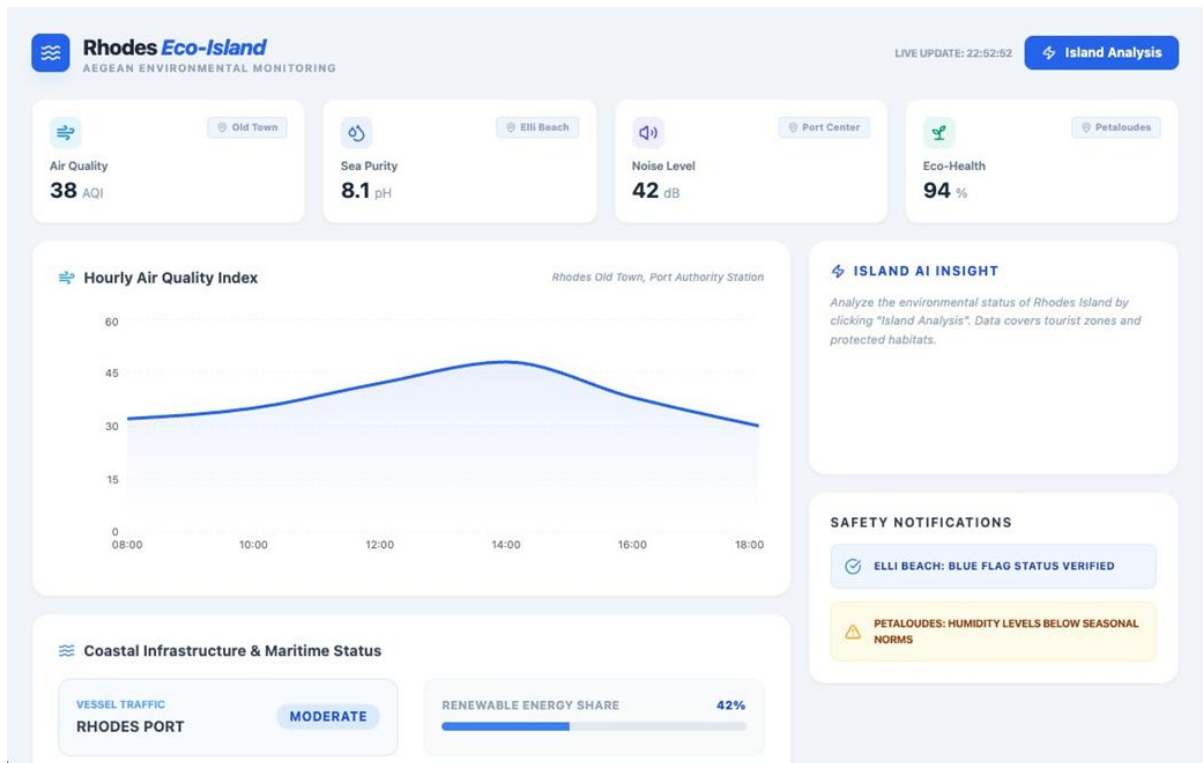
**AI LOMBARDY REPORT**

INITIALIZE THE AI ANALYSIS FOR AN IN-DEPTH REPORT ON BRESCIA'S INDUSTRIAL AIR FLOW AND PO VALLEY CLIMATIC IMPACT.

- SAFETY ALERTS**
- ⚠ PO VALLEY: THERMAL INVERSION RISK - HIGH AQI EXPECTED
  - ✅ LAKE GARDA: WATER CLARITY WITHIN EU DIRECTIVE LEVELS

**INDUSTRIAL SECTOR PERFORMANCE & CO2**

<p>CLUSTER STATUS</p> <p><b>BRESCIA OIZ</b></p> <p style="background-color: #007bff; color: white; padding: 2px;">ACTIVE</p>	<p>EMISSION TARGET (EURO-6)</p> <p>82%</p> <div style="width: 82%; background-color: #007bff; height: 10px;"></div>
--	---



## Sustainable Healthcare

### 4.c. Sustainable Healthcare

Sustainable healthcare refers to the design, delivery, and management of health services in ways that meet current population needs without compromising the ability of future generations to meet their own health needs. It integrates environmental responsibility, economic efficiency, and social equity into healthcare systems. In recent years, the integration of digital tools and artificial intelligence (AI) has emerged as a critical enabler of sustainable healthcare transformation.

#### 4.c.1. The Concept of Sustainability in Healthcare

Healthcare systems are resource-intensive, contributing significantly to carbon emissions, waste production, and energy consumption. According to the World Health Organization, the healthcare sector is responsible for approximately 4–5% of global greenhouse gas emissions (WHO, 2021). Sustainable healthcare aims to reduce this environmental footprint while maintaining or improving quality of care and accessibility.

The three pillars of sustainability—environmental, economic, and social—are all relevant in healthcare:

- **Environmental sustainability** involves reducing emissions, minimizing waste, and optimizing resource use.

- **Economic sustainability** focuses on cost-effective care delivery and efficient allocation of resources.
- **Social sustainability** ensures equitable access to healthcare services and improved patient outcomes.

Digital technologies and AI play a key role in advancing all three dimensions.

#### 4.c.2. Digital Tools Supporting Sustainable Healthcare

Digital health tools, including electronic health records (EHRs), telemedicine, wearable devices, and health information systems, contribute significantly to sustainability.

**Telemedicine**, for example, reduces the need for patient travel, thereby lowering carbon emissions and improving access to healthcare services, especially in remote areas (Smith et al., 2020). During the COVID-19 pandemic, telehealth adoption accelerated rapidly, demonstrating its potential to enhance both efficiency and sustainability.

**Electronic Health Records (EHRs)** reduce paper usage and improve data accessibility, enabling better coordination of care and reducing redundant tests and procedures (Bates et al., 2018).

**Wearable health technologies** allow continuous monitoring of patients, supporting preventive care and reducing hospital admissions. This not only improves patient outcomes but also reduces the burden on healthcare infrastructure.

#### 4.c.3. Artificial Intelligence in Sustainable Healthcare

Artificial intelligence is transforming healthcare by enabling more accurate diagnostics, personalized treatments, and efficient system management.

AI applications contribute to sustainability in several ways:

- **Predictive analytics** helps identify disease risks early, reducing the need for expensive treatments and hospitalizations (Esteva et al., 2019).
- **Resource optimization** through AI-driven scheduling and logistics reduces waste and improves efficiency in hospitals.
- **Medical imaging and diagnostics** powered by AI improve accuracy while reducing time and resource consumption.
- **Drug discovery** using AI accelerates research processes, reducing costs and resource use (Topol, 2019).

AI also supports population health management by analyzing large datasets to identify trends and inform public health strategies.

#### 4.c.4. Challenges and Ethical Considerations

Despite its benefits, the integration of digital tools and AI in healthcare raises several challenges:

- **Data privacy and security** are critical concerns, especially with sensitive health information.
- **Digital divide** issues may exacerbate inequalities if access to technology is uneven.
- **Ethical concerns** regarding AI decision-making, transparency, and accountability must be addressed.
- **Energy consumption of digital systems**, particularly large AI models, may offset some sustainability gains if not managed properly (Kaack et al., 2022).

Addressing these challenges requires robust governance frameworks, ethical guidelines, and inclusive policies.

#### 4.c.5. Future Perspectives

The future of sustainable healthcare lies in the continued integration of digital innovation with sustainability principles. Emerging technologies such as blockchain, Internet of Things (IoT), and advanced AI systems are expected to further enhance efficiency, transparency, and patient-centered care.

Healthcare systems must adopt a holistic approach, combining technological innovation with policy reforms, education, and stakeholder collaboration. By doing so, they can achieve a more resilient, equitable, and environmentally sustainable future.

## 5. Project Activities and European Cooperation

Purpose: Present key activities, mobility results, and cross-country collaboration.

Content:

### 5.1. Workshops and learning activities

#### A.1. Mobility to Italy "Sustainable practices in workplaces" 07-11 April 2025

The mobility with engaging workshops:

- The Importance of Laboratory Learning in Physics and Chemistry, led by Prof. Paola Apostoli and Prof. Bruna Raniolo
- Transition to University: Preparation for Selective Tests, facilitated by Prof. Anna Camplani

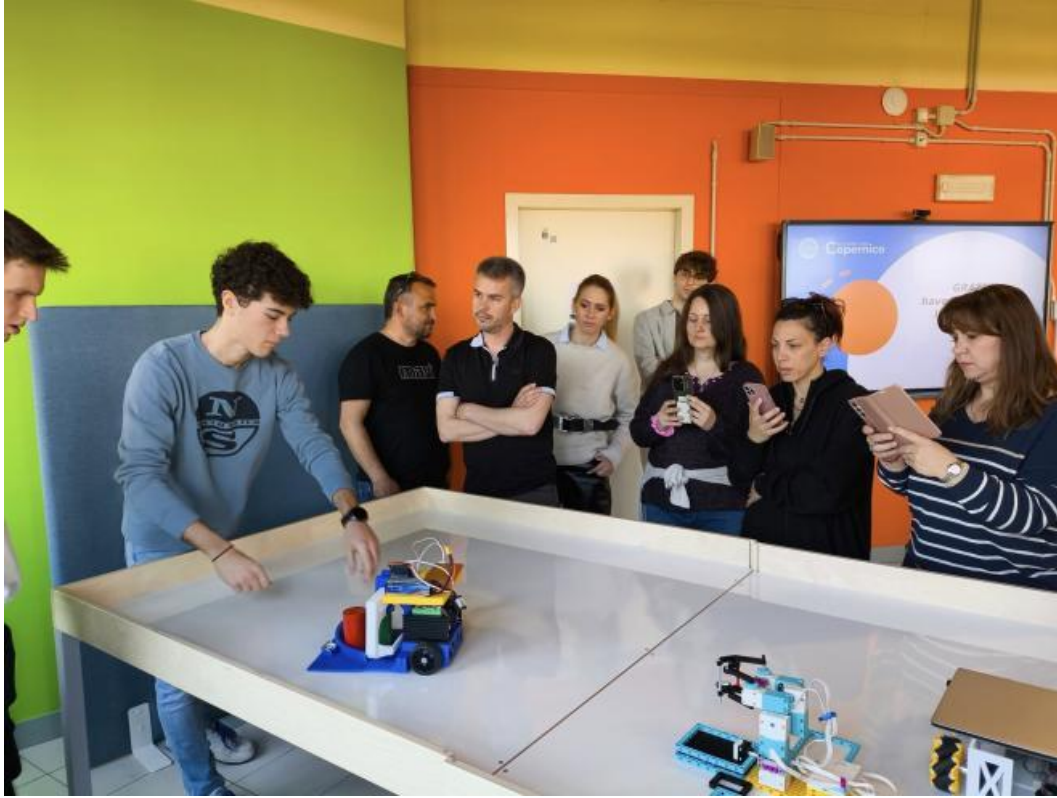
In the afternoon, the focus shifted to inclusive education and well-being, with a session on:

- Inclusion, School Well-being, and Youth Protagonism through Ensemble Music Practice, conducted by Prof. Staro
- Exploring Peer Education and Local Educational Policies in Brescia
- Skill Development and Cultural Discovery in Brescia
- “Coping with Expectations: The Difficulties of Students in the Process of Growing Up.”









## A.2. Mobility to Turkiye "Sustainability Lab" 6th -10th October 2025

- Introduction to Sustainable Practices at School /Zero Waste Mrs. Hacer Gokcek Nacar presented about the Zero Waste Project, which has been running since 2019 and concerns recycling, composting, and their benefits.
- Turkish Education System (Maksim POPELIANSKII) Our School and Vocational Training Programs (Yavuz Selim ÇOLAK-Sinan USLU) National and International Projects carried out at School (Bünyamin YİĞİT)
- Design the Future: Science and Sustainability Workshop (TÜBİTAK Science Projects Presentation and Exhibition) (at Robotics LAB by students from IT and Electric-Electronics Department)
- CNC Precision Manufacturing and Prototyping Workshop: Participants will experience all stages of the transition from design to product through hands-on practice. (at Furniture and Design Workshop by teachers Ali TUNÇ-Yaşar BAYKUŞ)
- Exchange of good practices "Sustainable School Example" (Visit to Kayasuyu Primary School)
- Presentation on Artificial Intelligence and Web 2.0 Tools (Canan KARADERE-Yaşar BAYKUŞ)











A.3 Mobility to Greece “Sustainability in education: Combining practices for a better future”  
20th - 24th of April 2026

- Presentation of Greek Education System (Kyriaki Anthopoulou), School sectors and specialties (Alexandra Christakidou, Ioanna Sotiriou, Kyriaki Anthopoulou).
- Cosmetics production workshop using natural materials (Eleftheria Magkaniari, Alexandra Christakidou ).
- Beauty, Hairdressing & Physiotherapy Labs. Hands-on workshops where students demonstrated skills and provided services in wellness-related fields. (Eleftheria Magkaniari, Alexandra Christakidou, Konstantina Patsiaoura, Eva Dimopoulou, Savvas Kiottou )
- School Mediation Workshop. Activities promoting conflict resolution and social inclusion within the school environment were presented by students. Teachers participated in a simulation. (Marianna Noumeropoulou)
- Circular Economy Business Project. Students presented a virtual enterprise they created that is reusing hotel materials to design a board game (Ioanna Sotiriou)
- AI for Wildlife Protection. Students presented an artificial intelligence application, they created, aimed at protecting deer. (Marianna Noumeropoulou)
- Solar oven demonstration workshop (renewable energy use). (Damianos Patsakiotis , Marianna Noumeropoulou)
- Workshops in the Environmental Education Center of Butterflies Valley (KEPEA). Augmented reality and artificial intelligence application for the Butterfly Valley habitat, Sustainability and Renewable Energy Sources. Interpretation of the workshops in English by Irini Mouzouraki.
- AI Skin Analysis Application. Innovative AI-based tool for assessing and analyzing skin needs. (Maris Apostolidi)
- Special Effects Makeup & First Aid Collaboration. Combined workshop integrating Special Effects makeup techniques with first aid training. (Maria Apostolidi, Stergiani Kalia).
- Demonstration of production of cosmetics made of natural ingredients like beeswax, cocoa butter, aloe vera at the cosmetics lab of the specialty of Beauty. (Eliza Spyrou and Maria Apostolidi).
- Cultural Heritage & Traditional Crafts Workshop. Learning traditional dances and making local sweets (melekounia, makoukia), emphasizing sustainability and cultural preservation.
- Digital Media & Literacy Workshop. Activities involving school newspapers, video production, and reading promotion. (Thomais Vergoti, Savvas Kiottou, Eleftheria Magkaniari)
- Extended Reality (XR) in Education Workshop. Presentation on the use of XR technologies in education to enhance learning experiences. (Aegean University)
- Social Contribution Crafts. Presentation of the initiative "Octopuses for Premies" fostering empathy, solidarity, and social responsibility. (Maria Thalassinou)













## 5.2. Joint projects and online cooperation

The schools collaborated within the framework of the eTwinning project titled “Fostering Sustainability and Inclusion in Education.” Throughout the project, students, guided by their teachers, engaged in joint creative activities and produced collaborative work. These included the design of the project logo, the creation of a Padlet dedicated to inclusion and a poster using the Canva platform, aiming to encourage their creativity and express their views on a sustainable future. The central message of the activity, “Together for a Sustainable Future,” reflected the importance of collective effort and active participation in shaping a better world. At the same time, students participated in cultural activities through which they presented the identity and cultural heritage of their region. More specifically, they highlighted elements such as traditional dances, local cuisine, customs and ways of life, as well as traditional art and music. Through this process, participants had the opportunity to explore and appreciate the cultures of other countries, fostering mutual understanding and respect for diversity. The students had the opportunity to meet and interact through an online meeting, during which they exchanged ideas, introduced themselves, and discussed common interests. The meeting helped strengthen communication, collaboration, and the development of a positive atmosphere among them, laying the foundation for more meaningful and effective cooperation moving forward.

In addition, the students from each school collaboratively created informational posters with sustainability proposals tailored to different specialties. All the material was collected and integrated into a QR code, providing easy and immediate access to the produced work. The QR code was printed on stickers, which were placed in plastic post-it holders and distributed to various businesses. Students and teachers were responsible for distributing them to businesses related to their field.

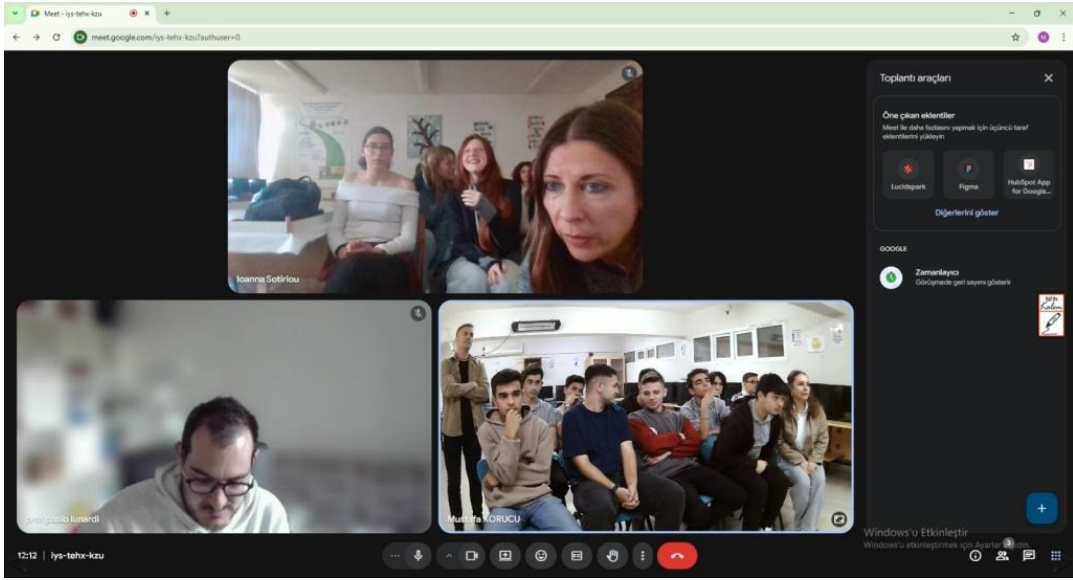
### «Sustainable Professional Development of Specialisations in Schools »



Co-funded by  
the European Union

**Erasmus+**  
Enriching lives, opening minds.







The teachers participating in the program maintained regular and effective communication through a variety of channels. They organized online meetings not only at the initial stage, in order to get to know one another, but also throughout the project's duration. These meetings played a crucial role in coordinating their efforts, facilitating the exchange and development of ideas, and ensuring a clear and balanced distribution of responsibilities. In addition, this ongoing communication fostered collaboration, strengthened teamwork, and contributed to the smooth and successful implementation of the program.

### 5.3. Good practices

The Model Vocational High School of Rhodes developed a student-run virtual enterprise focused on second-hand clothing, drawing inspiration from the practices implemented by the Liceo Scientifico Copernico di Brescia. The programme centered on the establishment and operation of a virtual student enterprise for second-hand garments, integrating the principles of the circular economy, entrepreneurship, and social contribution.

The thematic areas covered included: fundamental principles of the circular economy and entrepreneurship; marketing strategies; responsible consumption; the practical organization of clothing collection, sorting, and distribution; basic financial management and revenue reporting; as well as the development of social contribution initiatives, including the allocation of part of the proceeds to a charitable organization.

The main objectives of the programme were:

- To enable students to understand the core principles of entrepreneurship and the circular economy.
- To raise awareness of the importance of sustainable consumption and social responsibility.
- To familiarize students with basic economic concepts and marketing techniques.
- To foster the development of collaboration, communication, and problem-solving skills.

- To enhance students' competencies in organization, planning, and project management.

The programme was implemented through experiential and collaborative learning approaches. Students worked in groups, assuming specific roles (such as marketing, sales, and finance), and collaborated in decision-making processes. Information and Communication Technologies (ICT) were utilized for promotion and outreach purposes. In addition, meetings with relevant stakeholders were organized, alongside activities aimed at fostering social contribution.

#### **5.4. Photographic material and links**

<https://school-education.ec.europa.eu/en/etwinning/projects/fostering-sustainability-and-inclusion-education/twinspace/pages/dissemination>

[https://www.haberosmaniye.com/haber/kadirli-italya-ve-yunanistandan-gelen-misafirlerini-agirladi-25241#google\\_vignette](https://www.haberosmaniye.com/haber/kadirli-italya-ve-yunanistandan-gelen-misafirlerini-agirladi-25241#google_vignette)

<https://www.rodiki.gr/article/537253/p-epa-l-rodoy-pagkosmia-hmera-trofimwn-2025-biw>

[https://sehitkaancalinmtal.meb.k12.tr/icerikler/meslekiegitimdesurdurulebilirliktebiradimdaha-erasmussustainabilitylabturkiyeetabi\\_16712654.html](https://sehitkaancalinmtal.meb.k12.tr/icerikler/meslekiegitimdesurdurulebilirliktebiradimdaha-erasmussustainabilitylabturkiyeetabi_16712654.html)

[https://sehitkaancalinmtal.meb.k12.tr/icerikler/erasmusokullardauzmanliklarinsurdurulebilirmeslekigelisimiprojemizinturkiyeevsahipligibasariylatamamlandi\\_16682450.html](https://sehitkaancalinmtal.meb.k12.tr/icerikler/erasmusokullardauzmanliklarinsurdurulebilirmeslekigelisimiprojemizinturkiyeevsahipligibasariylatamamlandi_16682450.html)

[https://sehitkaancalinmtal.meb.k12.tr/icerikler/okullardauzmanlikalanlarininsurdurulebilirmeslekigelisimierasmusprojesikapsamindaitalyadagerceklestirilenpersonelhareketliligibasariylatamamlandi\\_16192768.html#](https://sehitkaancalinmtal.meb.k12.tr/icerikler/okullardauzmanlikalanlarininsurdurulebilirmeslekigelisimierasmusprojesikapsamindaitalyadagerceklestirilenpersonelhareketliligibasariylatamamlandi_16192768.html#)

## **6. Upgrading Curricula and Teaching Practices**

**Purpose:** Propose improvements in VET curricula and teacher practices.

**Subsections:**

### **6.1.1. Proposed fields of Changes/ Improvements for Aesthetics in Greek educational system**

Below are proposed some changes and improvements that could be implemented in the Study Guide for the Aesthetics Sector in the 2nd and 3rd grades of the Model Vocational Lyceum of our country. These aim both to meet the modern demands of the labor market better and also

enhance the quality of education, achieving the highest possible level of professional integration for our students.

To support the following proposal, a brief summary of the current situation is provided:

In the 2nd grade of the Health–Welfare–Wellness Sector, there are direction courses such as “Anatomy–Physiology I”, “First Aid”, “Health & Nutrition”, as well as specialized courses such as “Modern Aesthetics I”, which combines Theory (T) and Laboratory (L) practice.

In the 3rd grade, for the specialty of Aesthetic Art, the courses include: “Anatomy–Physiology II (3T)”, “Hygiene (2T)”, “Make-up (3L)”, “SPA & Hydrotherapy (1T + 2L)”, “Modern Aesthetics II (1T + 6L)”, “Nail Aesthetics–Nail Prosthetics (3L)”, “Cosmetology – Material Technology (2T)”.

Therefore, the proposed changes should focus on:

### **1. Updating and Strengthening Technological Knowledge and New Trends**

Introduction of courses covering new technologies in aesthetics, such as modern laboratory equipment for body and facial aesthetic devices, as well as digital applications (e.g., software for client management), so that students become familiar with them throughout their studies.

### **2. Collaboration with Businesses for Increased Practical Training**

Partnerships with aesthetic institutes, spas, and hotels to provide students with practical training in real working environments. Additionally, opportunities for internships abroad or in other regions should be offered through Erasmus+ programs.

### **3. Strengthening Theoretical Knowledge that Supports Practice**

Courses such as nail aesthetics and spa treatments should be modernized, as the Ministry of Education textbooks are outdated and include techniques no longer supported by the current market—materials for these techniques are not even available anymore.

Courses in entrepreneurship, marketing, and small business management should be added, enabling graduates to start their own business or understand how the industry operates professionally.

### **4. Enhancing Soft Skills and Communication**

Courses or workshops on customer service, client psychology, complaint management, aesthetician–client relationships, ethics, and professional image are essential in the aesthetics sector.

### **5. Connection with Sustainability and Innovation**

Introduction of environmental awareness as a course or module (e.g., waste management, use of environmentally friendly products). Laboratory preparation of innovative cosmetology products (e.g., natural cosmetics, sustainable raw materials, ecological practices).

## **6. Digital Educational Support**

Educational applications and seminars on new tools and products in the field delivered through digital media.

The upgrade of the Study Guide in the Aesthetics Sector is not merely a typical educational adjustment but a substantial investment in the future of our students and the industry itself. By integrating modern technologies, strengthening practical training, renewing the theoretical foundation, cultivating professional and interpersonal skills, and connecting with sustainability and digital education, we create a curriculum that meets the real needs of the labor market.

Our goal is to shape aesthetic professionals with knowledge, skills, confidence, and a modern professional identity—capable of competing in an ever-evolving environment. With these changes, the Model Vocational Lyceum can truly reflect the quality of education it provides.

### **6.1.2. Proposed fields of Changes/ Improvements for Economic sector in Greek educational system**

The integration of the principles of sustainable development into the curricula of the Economics and Business Administration sector of Vocational High Schools (EPAL) is a critical prerequisite for preparing professionals who can respond to the modern needs of the labor market and society.

Initially, it is important to strengthen students' theoretical education on issues of sustainable development through the introduction of distinct units or courses covering concepts such as the circular economy, social entrepreneurship, and responsible consumption. Students should understand not only the economic dimensions of businesses, but also the environmental and social impacts of their activities. The subject of Circular Economy has already been introduced in Model Vocational High Schools, and it would be beneficial to extend it to all Vocational High Schools.

At the same time, it is proposed to incorporate practical applications of sustainability into existing courses. For example, in business administration courses, case studies of sustainable business models can be included, while in tourism courses, best practices of sustainable tourism can be analyzed, such as natural resource management, waste reduction, and the protection of cultural heritage.

Furthermore, the development of skills through experiential learning is considered essential. Students can participate in projects related to the local community, such as designing proposals for sustainable tourism routes or evaluating the environmental performance of local businesses. In this way, theory is connected with practice, and students' active participation is enhanced.

Another important proposal is to strengthen cooperation with businesses and organizations that implement sustainable practices. Through educational visits, internships, or guest speakers, students will have the opportunity to engage with real-life examples and better understand market requirements.

Finally, it is proposed that student assessment should include not only knowledge, but also attitudes and skills related to sustainability, such as responsibility, collaboration, and critical thinking. Education should not be limited to the transmission of knowledge, but should aim at shaping conscious professionals and active citizens.

Overall, the reform of curricula with a focus on sustainable development can substantially contribute to the creation of a more responsible and resilient economic and tourism sector.

## **6.2. Integrating green and digital skills into teaching**

Integrating green and digital skills into teaching has become an essential priority in modern education, as societies face both environmental challenges and rapid technological transformation. Schools are no longer just spaces for knowledge transmission; they are environments where students develop the competencies needed to navigate and shape a sustainable and digital future.

Green skills in education focus on fostering environmental awareness, critical thinking, and responsible behavior. By embedding sustainability topics across subjects, teachers can help students understand the impact of human activities on the planet and encourage them to adopt eco-friendly habits. For example, project-based learning can engage students in real-life issues such as waste reduction, energy conservation, or biodiversity protection. These activities not only deepen their understanding but also empower them to become active participants in environmental solutions.

At the same time, digital skills are equally crucial. Students must be equipped with the ability to use technology effectively, safely, and creatively. This includes not only basic digital literacy but also skills such as coding, data analysis, online collaboration, and critical evaluation of digital content. Integrating digital tools into teaching can enhance engagement and personalize learning experiences. Platforms for interactive learning, virtual simulations, and collaborative projects allow students to explore concepts in dynamic and innovative ways.

The integration of green and digital skills offers a unique opportunity to create interdisciplinary learning experiences. For instance, students can use digital tools to research environmental issues, analyze data, and present their findings through multimedia projects. This combination encourages both technological proficiency and environmental responsibility. Moreover, it reflects real-world practices, where digital innovation is often used to address sustainability challenges.

Teachers play a key role in this integration process. Continuous professional development is necessary to ensure educators feel confident using digital tools and addressing sustainability topics. Collaboration among teachers, as well as participation in international programs such as Erasmus, can support the exchange of best practices and innovative approaches.

In conclusion, integrating green and digital skills into teaching is not just an educational trend but a necessity for preparing responsible, capable, and future-ready citizens. By combining environmental awareness with technological competence, education systems can empower students to contribute meaningfully to a more sustainable and digitally advanced world.

### 6.3. Examples of activities

Below are some examples of Project-Based Learning (PBL) lesson plans or learning modules that integrate sustainability and digital skills into Vocational Education and Training (VET) specializations.

#### *Health and Social Care Sector*

- **Sustainable Aesthetics and Cosmetics**

**Objective:** To design and produce a line of ecological cosmetic products.

**Activities:**

- **Practical Laboratory:** In-lab preparation of cosmetic products based on sustainable and natural raw materials, minimizing waste.
- **Environmental Management:** Creation of a waste management plan for a salon/spa, including the correct sorting of waste materials and the use of reusable containers.
- **Digital Skills:** Use of software for client management and for conducting a Life-Cycle Analysis of products to evaluate their environmental impact.

- **Nursing and Hospital Sustainability**

**Objective:** To reduce the ecological footprint of a simulated hospital ward.

**Activities:**

- **Laboratory Simulation:** Practical exercises on the rational use of medical consumables (gloves, bandages) to prevent waste.
- **Healthcare Waste Management:** Simulations of sorting medical waste (general, infectious, sharps) using color-coded bins, with a discussion on the environmental burden of healthcare waste.
- **Sustainable Health and Lifestyle:** Creation of digital awareness campaigns (videos/infographics) for patients on the health benefits of an ecological lifestyle (e.g., plant-based diets, physical exercise).

### *Economics, Business Administration, and Tourism Sector*

- **Launching Sustainable Ecotourism**

**Objective:** To develop a business plan for a sustainable tourism activity.

#### **Activities:**

- **Market Analysis:** Research and application of the "Triple Bottom Line" model (Profit, Planet, People) to evaluate business sustainability.
- **Green Strategy:** Design of renewable energy source use (e.g., solar panels) and adoption of efficient waste and water management systems (e.g., linen reuse programs) in accommodation facilities.
- **Digital Skills:** Use of digital tools for green finance, to evaluate investments based on environmental and social criteria, and to promote the business (sustainable tourism marketing).

### *Electrical-Electronics, ICT, and Plumbing Sector*

- **Smart Energy Monitoring in School Buildings**

**Objective:** To apply ICT and Electronics skills for energy efficiency.

#### **Activities:**

- **PBL with EcoTracker:** Students use IoT boards (like Arduino or ESP32) to simulate collecting data on energy consumption.
- **Data Analysis:** Data is visualized and analyzed through a dashboard, such as the EcoTracker prototype, to identify consumption peaks (lighting, air conditioning) and suggest AI recommendations for savings.
- **Applied Electronics:** Calculation and design for the installation of low-consumption systems (e.g., conversion to LED lighting) and evaluation of the economic return on investment (amortization).

- **Sustainable Water Management**

**Objective:** To design and calculate the efficiency of a rainwater harvesting system.

**Activities:**

- **Plumbing:** Design of a rainwater harvesting system on school rooftops for use in toilets or irrigation.
- **Maintenance:** Use of diagnostic devices and methods for detecting and repairing leaks in the school's plumbing systems, calculating the annual water savings.

### *Agricultural and Food Technology Sector*

- **Food Safety and Traceability**

**Objective:** To apply sustainability and safety standards in the agri-food sector.

**Activities:**

- **Laboratory:** Practical application of circular economy principles for reusing agricultural waste (e.g., composting or bioenergy).
- **Quality and Regulations:** Practical training on safety and quality standards (e.g., HACCP, ISO) for sustainable food production.
- **Agricultural Innovation:** Use of efficient irrigation systems (e.g., drip irrigation) and organic farming methods for the protection of biodiversity and soil.

## **6.4. How to use AI and digital tools effectively**

### *AI in Education: Bridging the Gap Between Policy and the Classroom*

An Epochal Shift

The integration of Artificial Intelligence (AI) into the educational landscape represents one of the most significant shifts in contemporary pedagogy. Beyond its technical capabilities, AI offers a dual-pathway for growth: providing advanced tools for personalized learning and optimizing administrative efficiency. However, this transition is not without friction, raising urgent questions regarding ethics, data privacy, and the evolving role of the educator.

The Regulatory Landscape: From the EU AI Act to National Guidelines

The "Wild West" era of AI is rapidly coming to an end as structured regulations take hold. At the European level, the Artificial Intelligence Act (Regulation EU 2024/1689) is the primary driver of change. Specifically, Article 4 introduces a mandatory requirement for AI Literacy for both technology providers and professional users. By February 2025, schools and organizations must ensure their staff possesses the competencies outlined in the DigComp 2.2 framework and the Digital Education Action Plan 2021–2027.

In Italy, this European mandate found its local footing in 2024 with the release of the Manifesto for Generative AI in Schools (MIAS). This document served as the blueprint for the Ministry of Education and Merit (MIM) to issue official guidelines. These guidelines emphasize:

- **Adaptive Learning:** Utilizing AI to tailor materials and assessments to the unique cognitive rhythms of each student.
- **Critical Thinking:** Acknowledging the risks of cognitive dependency and the potential loss of analytical skills.
- **Operational Autonomy:** Requiring each school to develop its own implementation model based on local needs and periodic impact monitoring.

#### The Reality Check: Analyzing the TALIS 2024 Data

Despite the robust legal framework, a significant gap exists between policy and practice. The TALIS 2024 international survey provides a stark "snapshot" of the current state of AI adoption in Italy compared to its European peers.

Metric	Italy	EU Average	Leading Countries (e.g., Estonia)
--------	-------	------------	-----------------------------------

Active AI usage in teaching	26%	35%	—
-----------------------------	-----	-----	---

Teacher participation in AI training	26%	33%	>50%
--------------------------------------	-----	-----	------

Perceived need for further training	<50%	>70%	—
-------------------------------------	------	------	---

The data suggests a cultural hurdle: 57% of Italian teachers who do not use AI believe it is fundamentally inappropriate for the classroom. Furthermore, teachers tend to underestimate the extent to which their students are already using generative tools independently, creating a "perception gap" that could hinder effective mentorship.

#### Training as a Strategic Antidote

The goal of investing in AI training is not merely to increase the frequency of use, but to improve the quality of interaction. Specialized training focused on pedagogical applications allows teachers to:

1. Become conscious mediators between the technology and the learner.
2. Decide with professional autonomy when AI adds value and when it poses a risk.
3. Guide students in navigating the ethical pitfalls of automated content.

## Case Study: The "Liceo Copernico" Model

While the national trend shows hesitation, Liceo Copernico serves as a beacon of proactive innovation. Building on a long-standing commitment to cyberbullying awareness, the school launched the "Gemini" Project this year. This initiative encouraged staff to pursue the "Google Certified Gemini Educator" qualification, aligning teacher skills with the latest generative AI standards.

The impact is already visible within the school's various departments. In the Mathematics Department, for instance, AI is being used as a tool to explore complex problems through multiple, deeper perspectives that traditional time constraints often prevent. By analyzing various AI-generated solutions, students learn to evaluate different logical paths, turning a "problem-solving" tool into a "critical-thinking" exercise.

### Conclusion: A Stimulating Challenge

As we look toward the coming years, the success of AI in schools will not be measured by the number of software licenses purchased, but by the readiness of teachers and students to embrace these challenges. The goal is a school system where technology does not replace the human element but empowers it to reach new heights of intellectual discovery.

### Online Resources.

- OECD (2024): Results from TALIS 2024  
[https://www.oecd.org/en/publications/results-from-talis-2024\\_90df6235-en.html](https://www.oecd.org/en/publications/results-from-talis-2024_90df6235-en.html)
- La Voce: Artificial Intelligence enters the classroom, but how?  
<https://lavoce.info/archives/109639/lintelligenza-artificiale-entra-a-scuola-ma-come/>
- Agenda Digitale: Artificial Intelligence in learning: challenges for teachers and students  
<https://www.agendadigitale.eu/scuola-digitale/intelligenza-artificiale-nellapprendimento-le-sfide-per-docenti-e-ragazzi/>

## 6.5. Teacher guide with classroom tips

In line with the **DigCompEdu** framework and the European Council's priorities for a fair and high-quality green and digital transition, this guide provides operational instructions for integrating active, constructivist, and social methodologies into daily practice. The goal is to transform classrooms into real laboratories for innovation and active citizenship.

### Integrating Artificial Intelligence with a Constructivist Approach

- **For Teachers (Professional Development and Pedagogy):** Do not merely passive observers of AI; become "conscious mediators." Train yourself on the ethical use of

prompts and use AI to lighten administrative burdens or to design differentiated lessons. DigCompEdu requires using digital tools to enhance teaching, not to replace it.

- **For the Classroom (Critical Thinking):** Turn AI into a debate partner. Instead of having AI generate an essay, ask students to have the machine produce a draft and then **criticize it, correct its biases, verify its sources**, and improve it. Activities like "Find the Error" or *Debates* on algorithm-generated texts place the student at the center (constructivism), making them a critical validator rather than a passive consumer.

#### Project-Based Learning (PBL) for the Green and Digital Transition

- **For Teachers (Teaching Practices):** Design interdisciplinary Learning Units (UdA) based on real-world labor market challenges (e.g., in the aesthetics sector, creating a sustainable cosmetics line). Evaluate the research process and the use of digital tools, not just the final product.
- **For the Classroom (Active Learning):** Students, divided into groups, use digital tools (spreadsheets, sensors, measurement apps) to calculate the environmental impact of a process or to research eco-friendly materials. They then create awareness campaigns through podcasts, blogs, or multimedia presentations. This combines digital skill development with ecological awareness.

#### Social Methodologies and Soft Skills Development

- **For Teachers (Student Empowerment):** Design structured activities in *Cooperative Learning* or *Jigsaw* patterns, assigning specific roles within groups (e.g., researcher, technology manager, sustainability expert).
- **For the Classroom (Collaboration and Inclusion):** Use cloud-based learning environments (virtual boards, shared documents) to foster collaboration even outside the classroom. Organize simulations or *Role Plays* (e.g., client management, complaint resolution, or presenting a business plan for a small business), which are essential for developing empathy, professional ethics, and social communication skills.

#### Adaptive Learning for Equity and Inclusion

- **For Teachers (Assessment and Inclusion):** Use data (Learning Analytics) provided by digital platforms to monitor student progress in real-time. DigCompEdu emphasizes the importance of using technology for accessibility: identify early those who need support and those who require more complex stimuli.
- **For the Classroom (Personalization):** Implement adaptive learning software that automatically calibrates the difficulty of exercises (e.g., in scientific or linguistic subjects) based on the student's answers. This ensures that students with difficulties receive extra explanations and immediate formative feedback, while faster learners can face advanced challenges, ensuring equity and respecting each student's unique cognitive pace.

## Digital Citizenship and Practical Sustainability (Labs)

- **For Teachers:** Act as a bridge between theory and work practice, promoting international exchanges (such as Erasmus+ projects) to show how the twin transition is addressed in other European countries.
- **For the Classroom:** Integrate technology into the laboratory. For example, use management software or applications to track the life cycle of products used in school labs (waste reduction, correct sorting, energy saving of machinery). Discuss in class the carbon footprint of digital technology itself (e.g., the energy consumption of servers and AI), promoting a sober and conscious use of the network.

## **7. Project Evaluation and Impact**

**Purpose:** Present measurable outcomes and reflections.  
**Content:**

### **7.1. What has changed in schools?**

#### **Introductory Points**

The program under the name “Sustainable Professional Development of Specialties in Schools” Erasmus project has generated a systemic transformation within participating schools, fostering a comprehensive reorientation, pedagogical approaches, and institutional values. Except for the profound beneficial role to the participants that is mutual code of communication and collaboration, foreign language contact and cultural exchange matters, numerous factors come to surface. This, exposes the multifaceted and multidimensional changes observed in the three participant schools following their preprogrammed engagement in Erasmus+ activities, centering around pedagogical practices, student outcomes, organizational structures, and internationalization. The impact of the project could be characterized both tangible and intangible as well as immediate and long term. Shifts in mindset and cultivation at the same time leads to a forward-looking educational ethos which is based on the sustainability of professions in schools.

#### **1. Professional Growth - Pedagogical Transformation**

A pivotal shift in teaching practices is certainly taking place. The integration of sustainability principles into everyday teaching methodologies is the core factor. Educators have adopted approaches to a more dynamic level, learner-centered pedagogies, incorporating project-based learning, interdisciplinary collaboration, and experiential activities. The teachers have embraced innovative methodologies for instance PBLs and collaborative problem-solving frameworks. The latter enabled the integration of sustainability concepts into diverse subject areas, thereby promoting learning and real-world relevance.

Simultaneously, the professional development of teachers has been significant. Firsthand experience approved to be the key. By participating in training sessions, workshops, and international exchanges, educators have enhanced their pedagogical repertoire and digital literacy. They have also developed a more reflective and adaptive teaching identity, demonstrating the awareness of their role as facilitators of transformative learning.

#### **2. Curriculum Enrichment**

The project has prompted a critical reassessment and subsequent enrichment of vocational curriculum. Sustainability is no longer treated as a peripheral theme but has been systematically embedded into course design and delivery. New data has been introduced, addressing key areas

such as sustainable resource management, green technologies, ethical production, and circular economy models. New modules, thematic units, and new practical workshops have arisen, focusing on areas such as circular economy, responsible consumption, renewable energy, and green strategies. This fact, ensures that vocational education aligns with nowadays labor market, framework demands and global sustainability goals.

### **3. Digital involvement and Innovation**

An additional dimension of change relates to the enhanced use of digital tools and technology. The project has accelerated the integration of digital platforms in teaching and learning process, enabling more interactive, flexible and collaborative educational experiences. Teachers familiarized with technological applications and practices and improved their skills.

Digital tools (apps, platforms, programs, robotics evolution) have been used not only to support learning but also to facilitate international communication, project management, and the dissemination of results. This has contributed to the development of digital competencies among both teachers and students who are mingled to programs.

### **4. Student Empowering and Engaging**

One of the most profound benefits of the project lies in the transformation of the student learning experience. Learners have become more active participants in their educational journey, engaging in hands-on, experiential learning activities that fostered their autonomy and motivation.

Through their involvement in sustainability-focused projects, students have developed a wide range of transversal competencies, including use of foreign language for educational reasons, critical thinking, systems thinking, collaboration, communication, and problem-solving and further work on demonstration skills.

### **5. Institutional and Organizational Evolution**

Beyond the classroom, the project has significantly influenced the broader institutional culture of participating schools. Sustainability has increasingly led to principles, strategic decision-making processes, strategic planning, and daily operations. Schools have already implemented a variety of environmentally responsible practices, policies and strategies, including waste reduction and recycling programs, composter use, energy efficiency measures (use of solar energy), and the promotion of sustainable consumption habits. The mobilities gave the opportunities for new ideas and ways of upgrading the school units. For instance, new spaces well equipped and organized could host new programs and workshops.

Moreover, the project has fostered a culture of collaboration and shared responsibility. Teachers, students, and administrative staff are more actively involved in collective initiatives, strengthening the sense of community and institutional cohesion.

## **6. Strengthening of External Partnerships and Community Engagement**

Another key area of benefits is the expansion of schools' engagement with external stakeholders. The project has facilitated the development of partnerships and further communication with local businesses, non-governmental organizations, or other organizations, thereby enhancing the practical relevance of education.

These collaborations have provided students with valuable opportunities for experiential learning, internships, and exposure to real-world applications of sustainability principles. Simultaneously, the schools have positioned themselves as contributors to the local sustainable development effort.

## **7. Internationalization and Intercultural Knowledge Exchange**

The participation in the Erasmus program has significantly strengthened the international dimension of participating institutions. Through mobility activities, transnational cooperation and knowledge exchange, the educators have been exposed to different educational systems, cultural perspectives, and innovative good practices exchange.

## **8. Long-Term Benefits, Transferability and Sustainability**

A critical aspect of the project's success lies in its potential for long-term impact and sustainability. The changes implemented are not limited to the project's duration but are embedded in schools' practices, ensuring continuity. School units could develop resources, methodologies, and strategic frameworks that can be transferred and adapted to different contexts. The creation of networks and partnerships further supports the scalability and dissemination of project outcomes. The project depicts a strong foundation, but its maintaining success lies on the ability of school units to maintain momentum and to be adapted to future challenges.

## **Conclusion**

In conclusion, the Erasmus project had a strong impact for meaningful and lasting change within participating schools. It has reshaped educational practices, empowered both teachers and students, and fostered a holistic approach to sustainability. The project's beneficial role is evident not only in outcomes but also in the development of a more responsible, innovative, and future-oriented school environment.

## 7.2. Teacher and student feedback

The qualitative evaluations and feedback collected following participation in the Erasmus project "Sustainable Professional Development of Specialties in Schools" highlight a systemic, profound, and multidimensional transformation within the involved educational institutions. The feedback provided jointly by teachers and students not only confirms the effectiveness of the initiatives undertaken but also outlines an extremely clear picture of the multiple tangible and intangible benefits, measurable in both the short and long term. The direct testimonies of the protagonists of the educational process reflect a radical shift in collective mindsets, consolidating the importance of a holistic approach and leading to a forward-looking educational ethos, firmly based on the sustainability of professions in schools.

### Teacher Feedback: Professional Growth and Pedagogical Transformation

Teacher feedback focuses predominantly on the evolution of their professional roles and the enrichment of teaching methodologies.

- **Adoption of Active Methodologies:** Teachers enthusiastically report the successful integration of sustainability principles into their daily teaching methodologies, defining this aspect as the central factor of change. They expressed great satisfaction in adopting much more dynamic approaches, utilizing learner-centered pedagogies.
- **Effectiveness of Project-Based Learning (PBL):** Evaluations and comments emphasize the effectiveness of Project-Based Learning (PBL), interdisciplinary collaboration, and purely experiential activities. Teachers have warmly welcomed these collaborative problem-solving frameworks, noting how they facilitated the inclusion of complex sustainability concepts across different subject areas, thus promoting learning that has real relevance in the outside world.
- **Development of a New Professional Identity and Curricular Enrichment:** First-hand participation in training sessions, workshops, and international exchanges proved to be the key to success, allowing educators to significantly expand their pedagogical repertoire. Teachers report having developed a much more reflective and adaptive teaching identity, demonstrating full awareness of their new role as facilitators of transformative learning. The teaching staff also positively evaluated the critical reassessment and consequent enrichment of vocational education programs, where sustainability is no longer treated as a peripheral theme but is systematically incorporated into course design. They expressed appreciation for the introduction of new modules concerning the circular economy, green technologies, ethical production, and renewable energy, thus ensuring alignment with labor market demands.
- **Digital Integration and Literacy:** A further strongly positive aspect emerged from the feedback is the clear improvement in digital skills. Teachers state they have become familiar with new applications and technological practices, using digital tools, apps, platforms, and robotics programs not only to support teaching but also to manage projects, facilitate international communication, and disseminate results.

## Student Feedback: Empowerment and Active Engagement

Student evaluations highlight how the project has radically transformed their learning experience, defining it as one of the most profound benefits of the entire program.

- **Increased Motivation and Autonomy:** Students report becoming much more active participants in their educational path. Direct involvement in practical, hands-on learning activities has significantly fostered their autonomy and personal motivation toward their studies.
- **Development of Soft Skills:** Student feedback highlights the acquisition of a wide range of transversal skills, developed precisely through their involvement in projects focused on sustainability. Notable among these skills are the use of foreign languages for educational purposes, critical thinking, systems thinking, strong peer collaboration, communication skills, problem-solving, and the refinement of demonstration abilities.
- **Growth of Digital Competencies:** As highlighted for teachers, students involved in the various programs also reported an essential development of their digital skills, organically integrated throughout the educational process.
- **Connection with the Real and Professional World:** Students expressed strong appreciation for the invaluable opportunities provided by the expansion of collaborations with external stakeholders. Partnerships with local companies and non-governmental organizations offered students precious opportunities for experiential learning, internships, and direct exposure to the practical applications of sustainability principles in the real world, improving the practical relevance of their education.

### 7.3. Social, digital, and environmental impact indicators

The qualitative feedback returned by teachers and students is mirrored and validated through the positive impact indicators recorded at structural and institutional levels, which measure the project's legacy.

- **Social and Community Impact:** Testimonies confirm that the project has promoted and nurtured a solid culture of collaboration and shared responsibility within the institutes. Teachers, students, and administrative staff report being much more actively involved in collective initiatives, a factor that has significantly strengthened the sense of community and institutional cohesion. Furthermore, international mobility and transnational cooperation activities have exposed educators to diverse cultural perspectives, promoting an essential exchange of intercultural knowledge and innovative best practices. In parallel, schools have positioned themselves as active contributors to sustainable development efforts at the local level.
- **Digital Impact and Innovation:** The enthusiasm of the school community is reflected in the tangible acceleration of the integration of digital platforms into teaching and

learning processes. This indicator unequivocally demonstrates how the dimension of technological innovation has enabled more interactive, highly flexible, and deeply collaborative educational experiences for all involved actors.

- **Environmental and Organizational Impact:** Feedback from the entire school community supports and certifies institutional evolution in a strictly ecological key. The culture of sustainability has decisively influenced procedures, strategic decision-making processes, planning, and the daily operations of schools. The institutes have already successfully implemented a series of environmentally responsible policies and practices, including rigorous waste reduction and recycling programs, the active use of composters, advanced measures for energy efficiency (such as the adoption of solar energy), and the widespread promotion of sustainable consumption habits. Mobilities have also provided ideas for reorganizing school spaces to host new laboratories.

### **Final Considerations on Project Transferability and Sustainability**

General feedback culminates in the realization that the benefits and results obtained possess strong long-term potential and are by no means limited to the duration of the Erasmus project. Teachers and administrators recognize that the implemented changes are now deeply rooted in school practices, ensuring continuity. School units have developed methodologies, resources, and strategic frameworks that can be easily transferred and adapted to different contexts. The creation of contact networks and partnerships further supports the scalability and dissemination of project results. Overall, the feedback collected demonstrates that the project has laid extremely solid foundations, redesigning educational practices and leading to the development of a much more responsible, innovative, and future-oriented school environment.

## **8. Future Vision and Cooperation Network**

**Purpose:** Ensure sustainability beyond the project.

### **8.1. Future project ideas**

The completion of this Erasmus+ project serves as a starting point for the development of new initiatives that will further strengthen sustainability in Vocational Education and Training (VET). Future projects can build on the experience and outcomes of the current project, expanding cooperation and introducing innovative practices.

Firstly, it is proposed to implement transnational projects focused on the application of green technologies in schools, such as energy saving, waste management, and the use of renewable energy sources. These actions can be combined with practical workshops (green labs), where students actively participate in hands-on, experiential learning activities.

At the same time, particular emphasis should be placed on the use of Artificial Intelligence and digital tools to promote sustainability. Future projects may include the development of digital learning platforms, applications for monitoring environmental indicators (e.g., energy consumption, air quality), and tools that support innovative teaching practices.

Furthermore, the development of interdisciplinary programs is highly recommended, connecting different vocational fields such as health care, tourism, agriculture, and technical professions. Through joint projects, students will better understand how sustainable practices are applied across various sectors.

Finally, an important direction is the active involvement of students in projects with social impact, such as collaborations with local communities, businesses, and organizations. In this way, learning is directly linked to real-life contexts, enhancing students' skills while contributing to sustainable development at both local and European levels.

### **8.2. Network continuation and partnerships**

The completion of this Erasmus+ project serves as a starting point for the development of new initiatives that will further strengthen sustainability in Vocational Education and Training (VET). Future projects can build on the experience and outcomes of the current project, expanding cooperation and introducing innovative practices.

Firstly, it is proposed to implement transnational projects focused on the application of green technologies in schools, such as energy saving, waste management, and the use of renewable energy sources. These actions can be combined with practical workshops (green labs), where students actively participate in hands-on, experiential learning activities.

At the same time, particular emphasis should be placed on the use of Artificial Intelligence and digital tools to promote sustainability. Future projects may include the development of digital learning platforms, applications for monitoring environmental indicators (e.g., energy consumption, air quality), and tools that support innovative teaching practices.

Furthermore, the development of interdisciplinary programs is highly recommended, connecting different vocational fields such as health care, tourism, agriculture, and technical professions. Through joint projects, students will better understand how sustainable practices are applied across various sectors.

Finally, an important direction is the active involvement of students in projects with social impact, such as collaborations with local communities, businesses, and organizations. In this way, learning is directly linked to real-life contexts, enhancing students' skills while contributing to sustainable development at both local and European levels.

### **8.3. Policy recommendations**

The completion of this Erasmus+ project serves as a starting point for the development of new initiatives that will further strengthen sustainability in Vocational Education and Training (VET). Future projects can build on the experience and outcomes of the current project, expanding cooperation and introducing innovative practices.

Firstly, it is proposed to implement transnational projects focused on the application of green technologies in schools, such as energy saving, waste management, and the use of renewable energy sources. These actions can be combined with practical workshops (green labs), where students actively participate in hands-on, experiential learning activities.

At the same time, particular emphasis should be placed on the use of Artificial Intelligence and digital tools to promote sustainability. Future projects may include the development of digital learning platforms, applications for monitoring environmental indicators (e.g., energy consumption, air quality), and tools that support innovative teaching practices.

Furthermore, the development of interdisciplinary programs is highly recommended, connecting different vocational fields such as health care, tourism, agriculture, and technical professions. Through joint projects, students will better understand how sustainable practices are applied across various sectors.

Finally, an important direction is the active involvement of students in projects with social impact, such as collaborations with local communities, businesses, and organizations. In this way, learning is directly linked to real-life contexts, enhancing students' skills while contributing to sustainable development at both local and European levels.

## Appendix & Resources

### References

Aggelopoulou, N., (2024). Good Practices in Sustainable Tourism. Hellenic Open University. [apothesis.eap.gr](http://apothesis.eap.gr)

Alexaki, S. (2026). Decisions on Teacher Professional Development in Soft and Hard Skills: A Behavioral Economics Perspective. University of Piraeus.

Amberg, N. & Magda R. (2018). Environmental pollution and sustainability or the impact of environmentally conscious measures of international cosmetic companies on purchasing organic cosmetics. *Visegrad Journal on Bioeconomy and Sustainable Development*, 7(1), 2–6. <https://reference-global.com/article/10.2478/vjbsd-2018-0005>

Bates, D. W., Landman, A., & Levine, D. M. (2018). Health apps and health policy: What is needed? *JAMA*, 320(19), 1975–1976. <https://doi.org/10.1001/jama.2018.14378>

Elkington, J. (1994). Towards the sustainable corporation: Win–win–win business strategies for sustainable development. *California Management Review*, 36(2), 90–100.

Esteva, A., Robicquet, A., Ramsundar, B., Kuleshov, V., DePristo, M., Chou, K., Cui, C., Corrado, G., Thrun, S., & Dean, J. (2019). A guide to deep learning in healthcare. *Nature Medicine*, 25(1), 24–29. <https://doi.org/10.1038/s41591-018-0316-z>

Good Practices in Sustainable Tourism. (2024). Hellenic Open University – Apothesis. [apothesis.eap.gr](http://apothesis.eap.gr)

Hatos, H. & Konczos Szombathelyi, M. (2025). Indicators of sustainability in vocational education and training institutions. *International Journal of Innovative Research and Scientific Studies*, 8(3), 62–73. <https://doi.org/10.53894/ijirss.v8i1.6859>

Hliadis S., (2021) Sustainable Tourism Development and Social Well-being in Rhodes: Trends and Prospects.   
file:///C:/Users/User/Downloads/140049\_%CE%97%CE%9B%CE%99%CE%91%CE%94%CE%97%CE%A3\_%CE%A3%CE%A4%CE%91%CE%A5%CE%A1%CE%9F%CE%A3%20(1).pdf

International Commission on the Futures of Education. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO.

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527. <https://doi.org/10.1038/s41558-022-01377-7>

Kahneman, D. (2013). *Thinking, Fast and Slow*.

Li , X-Z., Chen, C. C. , & Kang X. (2022). Research on the cultivation of sustainable development ability of higher vocational students by creative thinking teaching method. *Frontiers in Psychology*, 13, 1018206. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.979913/full>

Martins, A.M. & Marto, J.M. (2023). A sustainable life cycle for cosmetics: From design and development to post-use phase. *Cleaner and Responsible Consumption*, 10, 100117. *Sustainable Chemistry and Pharmacy*, 35, 101178. <https://www.sciencedirect.com/science/article/pii/S2352554123002127?via%3Dihub>

Mondello, A., Salomone, R., Mondello, G. (2024). Exploring circular economy in the cosmetic industry: Insights from a literature review. *Environmental Impact Assessment Review*, 105, 107443. <https://doi.org/10.1016/j.eiar.2024.107394>

OECD. (2018). *Frameworks on Global Citizenship and SDGs*.

Perret, J.K., Gómez Velázquez, A. & Audrey Mehn. (2025). Green cosmetics—The effects of package design on consumers' willingness-to-pay and sustainability perceptions. *Sustainability*, 17(6), 2581. <https://doi.org/10.3390/su17062581>

Rocca, R., Acerbi F., Fumagalli L. & Taisch (2022). Sustainability paradigm in the cosmetics industry: State of the art. *Cleaner Waste Systems*, 3, <https://www.sciencedirect.com/science/article/pii/S2772912522000574>

Smith, A. C., Thomas, E., Snoswell, C. L., Haydon, H., Mehrotra, A., Clemensen, J., & Caffery, L. J. (2020). Telehealth for global emergencies: Implications for COVID-19. *Journal of Telemedicine and Telecare*, 26(5), 309–313. <https://doi.org/10.1177/1357633X20916567>

Sourgiadaki M.& Karkalakos S. (2023). GreenComp as a tool for examining motivation of vocational teachers to create learning opportunities for the green transition. *SN Social Sciences*, 3,114. <https://link.springer.com/article/10.1007/s43545-023-00699-3>

Thaler, R. H., & Sunstein, C. R. (2021). *Nudge: The Final Edition*.

Topol, E. (2019). *Deep medicine: How artificial intelligence can make healthcare human again*. Basic Books.

Vakallopoulou, S. (2013). Ecological innovation, entrepreneurship, and sustainable tourism development [Undergraduate thesis]. Technological Educational Institute of Crete, School of Management and Economics. <apothesis.hmu.gr>

World Health Organization (WHO). (2021). *Health care climate footprint report*. WHO Press.

## Links

eTwinning link: <https://school-education.ec.europa.eu/en/etwinning/projects/fostering-sustainability-and-inclusion-education/twinspace>

## **Websites and blogs**

<https://blogs.sch.gr/pepal-rodou/>

<https://sehitkaancalinmtal.meb.k12.tr/>

<https://copernicoprato.edu.it/>