International Conference
The Future of Education

GreenTeach: Advancing Vocational Education through a Sustainability-Driven Curriculum

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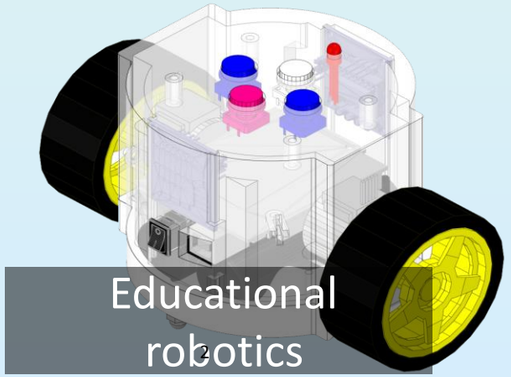
WHO WE ARE

A Multidisciplinary Research and Development Centre involved in several International, European and National projects.



International and EUROPEAN PROJECTS

G.A. STEM

TeamStar
digital and STEM careers
BEST PRACTICE

BoostClass2.0

PROJECT NATURE
BEST PRACTICE

UPPScience

digital stories

DIGICULT

GreenTeach

C4G

BigGame Project

DESIGN THINKING Skills

ICT-INOV
MODERNIZING ICT EDUCATION FOR HARVESTING INNOVATION

- EU-Track’s Vice-President and Coordinator of Education and Training Activities.
- PhD in Methodology of Education in Mathematics, Computer Science and Information Technologies.
- Researcher in Innovative Technologies Applied to Learning and Teaching, Multimedia Teaching Environments.
- Expert in the Development and Management of Projects at an International Level.
- Evaluation Expert for the Erasmus Plus Projects

Erasmus+

SCIENTIX
AMBASSADOR
The community for science education in Europe

Google for Education
Certified Educator Level 1

Google for Education
Certified Educator Level 2

Valutazione delle competenze del formatore
Certificato di conseguimento

- Scientific Coordinator of research activities at the EU-Track;
- PhD in New Technologies for Materials, Sensors and Imaging (University of Naples Federico II, 2014);
- Graduate in Electronics Engineering, Kazakh National Technical University (2006);
- Member of the Reviewer board of MDPI journals.
- Evaluation Expert for the Erasmus Plus Projects
- Teaching Assistant in NEMS and MEMS design at the University of Rome La Sapienza.
- Visiting Professor at the National Eurasian University L.N.Gumilyov.

SCIENTIX AMBASSADOR The community for science education in Europe

biosensors electronics actuators

SAPIENZA UNIVERSITÀ DI ROMA

EURASIAN NATIONAL UNIVERSITY

Google AI Essentials Certificate of Completion

Erasmus+

GreenTeach – Erasmus+ Project

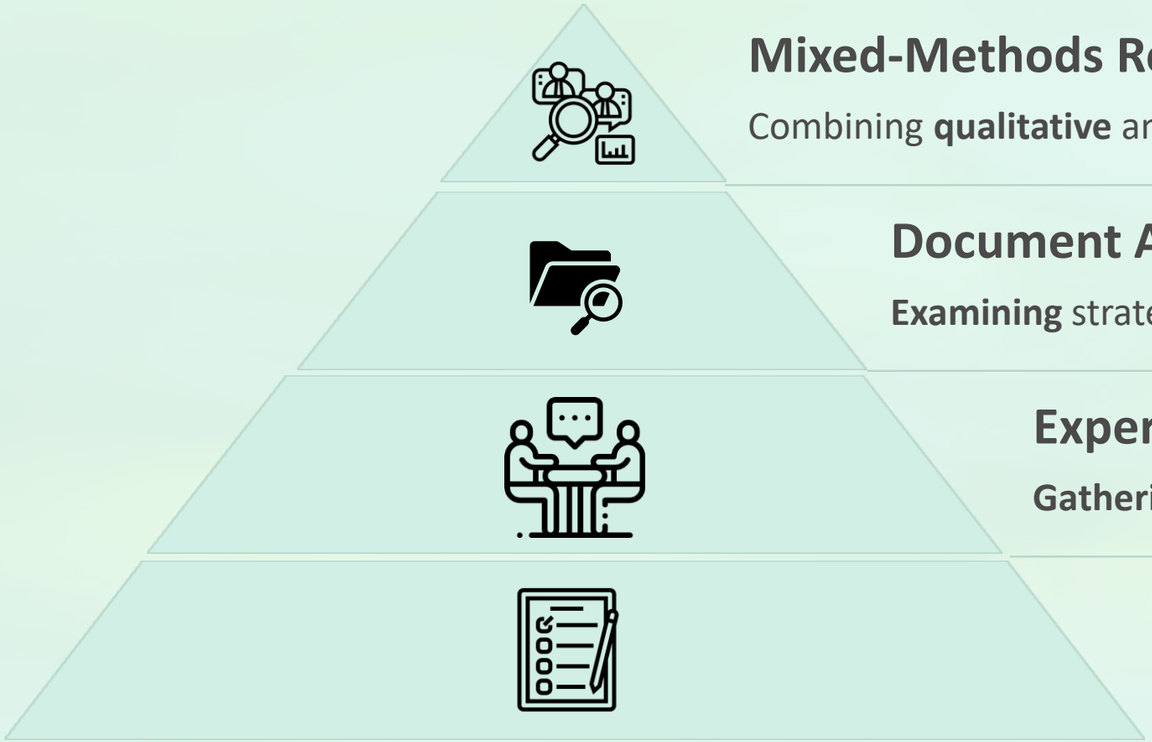
- **Goal:** Innovate Vocational Education and Training (VET) through **sustainability**
- **Countries involved:** Bulgaria, Italy, Romania, Turkey
- **Focus:** Skills for the **green and digital transitions**
- **Aligned with:** *European Green Deal and GreenComp Framework*

Through a **comprehensive framework** addressing **training**, **teachers**, **stakeholders**, **funding**, and **strategy**, GreenTeach aims to **bridge** the **gap** between **growing awareness** of **sustainability's importance** and **educators' confidence** in implementing related topics.

The **project's research** reveals both **challenges** and **opportunities** in creating a more **sustainable approach** to **vocational education**.

Project Framework and Methodology

Aim: Assess sustainability integration in VET systems



Mixed-Methods Research

Combining **qualitative** and **quantitative approaches**

Document Analysis

Examining strategic **documents** and **educational guidelines**

Expert Interviews

Gathering insights from **20 VET specialists**

Teacher Questionnaires

Assessing training **needs** of **204 VET educators**

Outcome: In-depth **qualitative insights**

Project Framework and Methodology

Target group: VET teachers in Bulgaria, Italy, Romania, Turkey

Key focus areas:

- Awareness of sustainability frameworks
- Confidence in teaching sustainability
- Digital skills
- Training needs in sustainability education

Teacher Demographics and Experience

Teacher Profile

- Majority aged **35–54** → **Experienced workforce.**
- Many with **20+ years** of teaching experience
- Strength: **Institutional knowledge.**
- Challenge: Possible **resistance to new methods.**

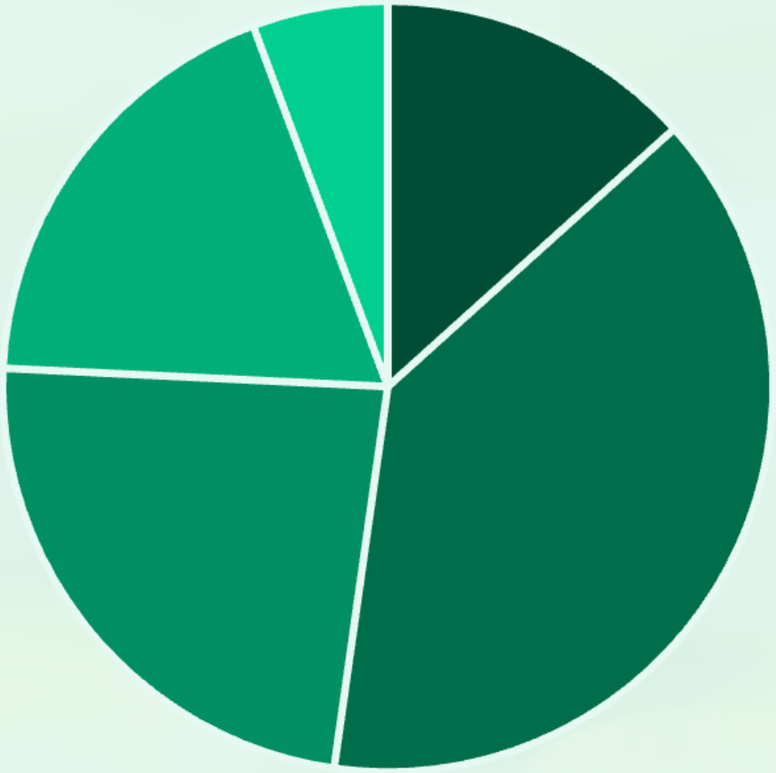
Gender Distribution

- High % of female teachers:
  - Italy: **80.6%**
  - Bulgaria: **68%**
  - Romania: **86.1%**
  - Turkey: **51.6%**
- Implication: Opportunity for **gender-sensitive** professional development in sustainability education

Experience vs. Adaptability

- **20+ years** of teaching → strong **subject expertise**
- But: May follow **established routines**
- → Need for **targeted support** to adopt sustainability-focused methods

The GreenComp Framework Challenge

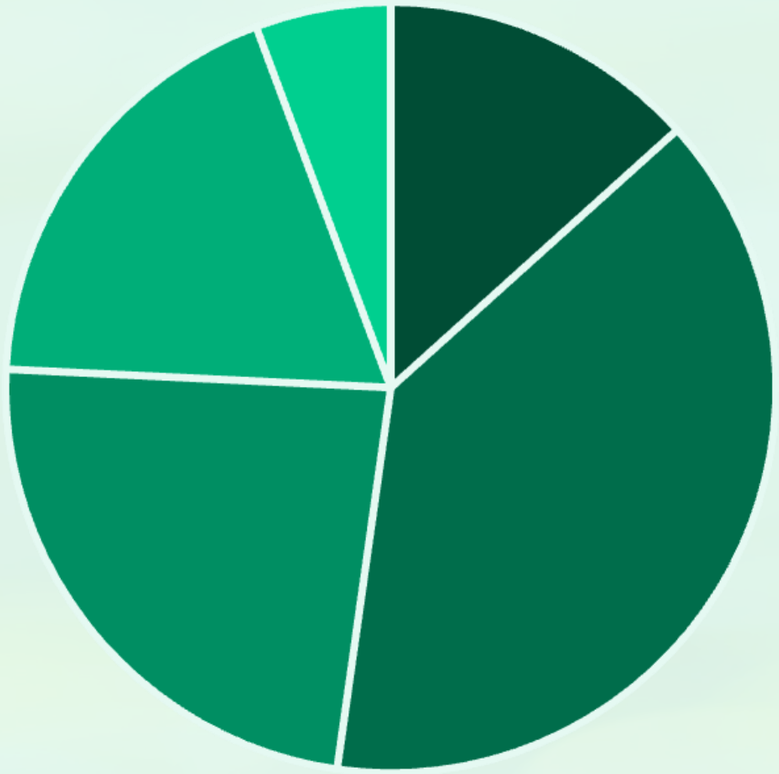


Very/Extremely Familiar
Familiar
Moderately Familiar
Slightly Familiar
Not Familiar At All
No Response

Key Finding – Knowledge Gap on GreenComp

- **79.41%** of teachers teach **sustainability topics**
- But only **13.34%** are **very** or **extremely familiar** with **GreenComp**
- → **Significant gap** between **practice** and **awareness** of EU sustainability framework

The GreenComp Framework Challenge



Limited Awareness of Green Standards

- Low familiarity with:
  - **ISO 14001**
  - **EMAS**
  - **UN SDGs**
- **Critical gap** between **teachers' motivation** and **knowledge** of **guiding frameworks**

Very/Extremely Familiar
Familiar
Moderately Familiar
Slightly Familiar
Not Familiar At All
No Response

Current Integration of Sustainability in Teaching

Integration Status

79.41% of teachers report **incorporating sustainability sustainability topics** into their **teaching**, with **28.91% 28.91%** doing so **regularly** and **50.50% occasionally**. **occasionally**.

Perceived Importance

There is **strong consensus** across all **countries** on the **crucial importance** of embedding **sustainability competences** in **VET curricula**.

Confidence Gap

Despite willingness to **teach sustainability topics**, confidence **levels** remain **moderate**, with **38.24%** feeling moderately confident and **27.94%** expressing **low** or **no confidence.**

Implementation Challenges

Teachers identified **curriculum modernization**, specific **training needs**, and **insufficient resources** as **key barriers** to effective **sustainability integration**.

Implementation Gap in Sustainability Education

Teachers **value sustainability**, but…

- Lack **skills, support, and resources** to implement it effectively

→ Need for **structured guidance** and **practical tools**

Pedagogical Approaches for Sustainability

Established Methods

Teachers report **higher confidence** in **traditional approaches** like **Inquiry-Based Learning** and **Experiential Experiential Learning** when teaching **sustainability sustainability concepts**.

Innovative Approaches

More contemporary methods such as **Design Thinking Thinking** and **Microlearning** show **lower adoption rates rates** despite their **potential effectiveness** for **sustainability education**.

Most Effective Methods

Project-**B**ased **L**earning, **I**nquiry-**B**ased **L**earning, **E**xperiential **L**earning, **Case Studies**, and **Field** Trips **are** Trips **are** identified as particularly **effective** for **teaching teaching sustainability concepts**.

Training Gap

The **vast majority** of teachers (**up to 88.9% in Romania**) **Romania**) have **not received** formal **training** in modern modern **teaching methodologies** despite **strong interest interest** in **professional development**.

Need for Pedagogical Innovation

Strong interest in **experiential & project-based learning**

BUT Teachers often lack **training** and **confidence** to apply these methods

→ Urgent need for **targeted professional development** in **sustainability education**

Digital Competencies for Green Education

Current Digital Skills

- **Italy:** 38.9% moderately confident, 20.8% low confidence
- **Bulgaria:** ~50% confident/very confident
- **Romania:** 75% use digital tools well/very well

→ **Mixed Levels Across Countries** among VET teachers

Resource Creation

Teachers express **varying levels** of **confidence** in **creating digital** educational **resources** for **sustainability topics**, indicating a **need** for targeted **support**.

Interest in Digital Training

- High interest across all countries:
  - **Italy:** 91.7%
  - **Bulgaria:** >95%
  - **Romania:** 91.7%
  - **Turkey:** 93.9%

→ Clear call for **digital upskilling** in sustainability education

Integration Challenges

Teachers seek **better integration** of digital tools

Aim: **Enhance** learning, not **complicate** it

→ Need for **user-friendly, purposeful digital strategies**

Digital Tools in Sustainability Education

- **Digital dimension** is key to effective VET sustainability teaching
- High **interest**, but **uneven competence** across countries

→ Urgent need for **targeted training** to link digital skills with sustainability content

Preferred Professional Development Formats

Blended Learning

- **Popular in**:

  - Italy: 43.1%

  - Bulgaria: 52.4%

  - Romania: 52.8%

- Combines **online flexibility** with **in-person engagement**
- Ideal for **working professionals**

Online Courses

Favored by **teachers** in:
- Italy: 41.7%
- Bulgaria: 50.8%

Benefits:
- Learn at own pace
- Adapt to individual schedules

In-Person Workshops

Preferred:
- Turkey: 66.7%
- Romania: 56.6%

Benefits:
- Immediate feedback
- Hands-on experience
- Networking opportunities

Diverse Preferences for Professional Development

- Varied training format preferences across countries
- **No one-size-fits-all** solution
- Effective programs require **multiple modalities**
- Must consider **learning styles**, **institutional** and **cultural contexts**

Priority Areas for Professional Development

Strengthening Industry Connections

Align VET curricula with:

- **Real-world sustainability practices**
- **Emerging green job needs** → Closer **VET–industry partnerships** essential

Curriculum Integration

- Develop **strategies** to embed sustainability into **existing curricula**
- Ensure relevance **without adding content burden**

Digital Tools Application

- Improve ability to **create engaging digital resources**
- Focus: **Effective sustainability-focused content**

GreenComp Framework Application

- Develop **understanding** of the EU sustainability framework
- Build **practical skills** for effective implementation

Key Priorities for Sustainability in VET

- Teachers recognize **sustainability as multifaceted**
- Training should cover:
  - **Content knowledge**
  - **Pedagogical methods**
  - **Practical strategies**
  - **Industry relevance**
- Strong focus on **workplace alignment**

Conclusions

Growing Awareness

Increasing recognition of sustainability's **importance** in VET across all partner countries

Stakeholder Collaboration

Essential partnerships between **educators**, **industry**, and **policymakers**

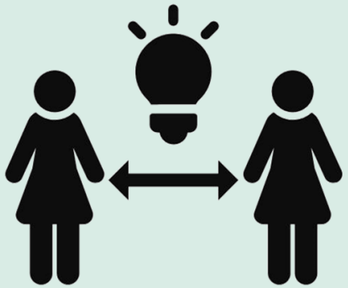
Competence Gap

Clear disconnect between **awareness** and **actual implementation capabilities**

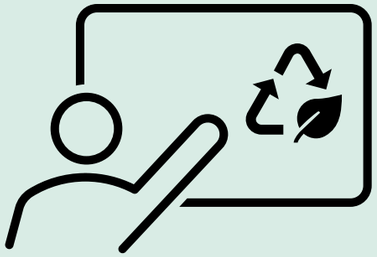
Training Need

Urgent **requirement** for **structured professional development opportunities.**

Challenges:



Knowledge gaps among teachers



Low confidence in **teaching** sustainability

Limited access to **resources** and **training**

- Develop **targeted interventions** to meet key needs:

    - Structured professional development aligned with **GreenComp**
    - Practical pedagogical resources for VET
    - Enhanced **industry collaboration**
    - Support for **curriculum integration**

Goal: Transform VET into a **driver of sustainable development** in Europe

NEXT STEPS

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Thank you for your attention

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