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GreenHive

Comparative Report on **Sustainable Education in Vocational Education and Training (VET) in Europe**



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Green Hive Consortium

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I. Executive Summary

Greenhive is a Cooperation partnership in the Vocational Education and Training (VET) field co-funded by the Erasmus+ Programme of the European Union. Implemented by a consortium of five entities; the *Technological University of the Shannon: Midlands Midwest* (Ireland), the companies *Lasco* (Italy) and *Femxa* (Spain), and the non-profit and non-governmental organisations *KEAN* (Greece) and *Team 4 Excellence* (Romania). The project aims to increase the capacity of VET providers to prepare learners for the green transition by developing a European platform-based ecosystem for sustainability education called the "Green Hive".

There is broad agreement from all respondents that SE is increasing in popularity but that its delivery is not sufficient. Teacher/trainer education is needed, and training is considered the biggest growth challenge to the expansion of the sector. Challenges in this area include insufficient funds/resources for training, and insufficient expertise to increase the numbers of staff with appropriate skills and experience. In relation to priority training needs, increasing knowledge and skills is identified as being of critical importance.

This report offers an introductory document to inform the development of a "Methodological Framework", a "Toolkit for the setup and management of Green Combs", "Educational resources for Green Combs", the "Green Hive" platform based on the results of the extensive research. The survey results, at EU level, highlighted the following:

- The common theme across the educators' responses in all the questions is their concern and interest in the development of sustainability competencies in vocational education and training (VET).
- It is up to individuals within schools or educational organisations to lead on sustainability practices and that integration into the wider curricula would support the efforts within each country.
- there is a growing interest in sustainable practices within education and VET with the rise of digital learning and awareness of climate action and sustainable policies.
- the effectiveness of sustainability competencies depends on the dedication and commitment of educators in an already busy work environment.
- Educators' express concerns about the inadequacy of current practices for developing sustainability competencies. They are often theoretical and not effectively implemented in VET programs.
- It is noted that lack of support from within institutions can create a barrier to implementation of sustainable practices
- lack of accessible training opportunities for educators can result in a lack of expertise available.



- There are many barriers highlighted to implement GreenComp¹ competences into the curricular framework in institutions. These include a lack of resources and a lack of support at the institutional level which is needed to drive a change in the educational framework.
- Resistance to change can occur when the curriculum has been already set and there is no motivation to change it.
- There is a lack of excellent quality resources available for educators and this can lead to a lack of confidence or unwillingness when implementing new ways of working.
- There are benefits in implementing sustainable competences within all learning and these include a contribution to sustainable economies throughout Europe, being more aware of sustainability practices, having knowledge of practices to develop a new way of living, having more sustainable practice skills for the workplace and shaping a greener future.
- There is limited understanding of the effectiveness when implementing sustainable competences within curriculum. More robust monitoring and evaluation tools, structure and frameworks are needed to measure the impact on the institutions, educators, learners, and society to foster support and commitment from outside agencies and organisations.
- It is necessary to have dedicated resources readily available for all educators to integrate sustainability practices into all teaching and learning.
- Staff and tutor training is key to legitimately implement GreenComp sustainability competences into the core curriculum.
- There is a low level of awareness surrounding the GreenComp framework and although there is some awareness at a theoretical level, there is limited knowledge at operational level.
- Recently more institutions are taking a more proactive approach to implement sustainability practices, however, they are often overshadowed by economic and academic outputs instead.
- Immersive teacher training and pupil learning, development of practical methodologies and project-based learning are all ways that can further advance the development of sustainability competencies in VET.
- taking practical actions on site can support confidence and instil a norm like behaviour within the institution. Involving learners in sustainability challenges and leading by doing such as changing to more energy efficient heating and lights and increasing recycling can promote the changes from the top level in the institution.
- There have been many organisations identified as potential collaborators, such as industry partners, NGO's, public agencies, government bodies and other education networks. VET institutions to be successful cannot work in silo and must interact with partners in local and national organisations, as there can be cross academic benefits, job opportunities, a chance to deliver and inform policy changes and to build relations with external organisations.

¹ Bianchi G., Pisiotis U. & Cabrera M. (2022). GreenComp The European sustainability competence framework, Punie, Y. and Bacigalupo, M. editor(s), EUR 30955 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-46485-3, doi:10.2760/13286, JRC128040.



- Need to align education with the Sustainable Development Goals through the curriculum and create a societal awareness of sustainable practices in everyday living and see these global goals as guiding objectives for VET programs.
- Educators stress that sustainability competencies are essential for both personal and societal well-being and see these skills as contributing to individual growth and addressing global challenges.



II. Introduction

This comparative report aims to outline the current status of sustainable education in Vocational Education and Training (VET) across Europe. It involves examining various aspects of sustainability, VET systems, policies and practices in Ireland, Spain, Italy, Greece, and Romania focusing on their alignment with sustainability initiatives. It highlights key aspects of each country's VET framework, emphasising their efforts to integrate sustainability education and prepare students for the challenges of the modern workforce.

Sustainability in education is a new idea, which has required a huge amount of change in syllabi and curriculums throughout Europe. This report will evaluate how Europe's educators and trainers integrate the sustainable competences of the GreenComp Framework into education throughout Vocational Education and Training programmes.

The Green Hive will consist of localised hubs for sustainability education, namely the "Green Combs," established within VET providers. While the Hive will be an open and cross-sectoral long-term cooperation network dedicated to innovation, continuous improvement and co-creation in sustainability education, the Combs will make VET providers the managing centre of networks of local stakeholders (i.e., companies, representatives of universities, civil society organisations and professional associations) for learning, networking and cooperating on sustainability challenges.

Hence, the project promotes the establishment of permanent VET co-creation structures where students will be enabled to think in systems, understand the interconnectedness of the economy, society and environment, and ultimately develop their systemic and critical thinking competencies by collaborating with other students and external stakeholders.

Four main results will be co-developed with over 500 VET experts in the scope of the project:

- a "Methodological Framework" for developing a VET sustainability education ecosystem and localised hubs to facilitate the transfer of local experience, knowledge, and innovation in the field of the implementation of the European Sustainability Competence Framework "GreenComp", and encourage collective actions of VET providers, learners, and external stakeholders to co-create solutions for sustainability;
- a "Toolkit for the setup and management of Green Combs", including a how-to guide and canvases to support VET providers in setting up, managing, and growing internal hubs for sustainability education;
- "Educational resources for Green Combs", including guidelines to implement open spaces for discussion around learner-generated topics among members of localised hubs, micro-learning videos, workshop scenarios and project-based learning experiences in the four competence areas of the GreenComp;
- the "Green Hive" platform, connecting the hubs through the Internet and providing capacity-building opportunities and digital tools for VET institutions,



knowledge-transfer spaces, and co-creation activities for its members. By the end of 2025, the Green Hive is expected to host and connect at least 15 localised hubs and 200 VET learners in 5 countries.

The aim of this report is to provide a comparative report outlining the key findings and conclusions of the research undertaken in the 5 partner countries regarding the current strengths and weaknesses in Sustainable Education in VET and assessing the current status and best practices in the development of the knowledge, skills and attitudes defined by GreenComp. GreenComp or the *European Sustainability Competence Framework* is the non-prescriptive reference framework for learning for environmental sustainability that can be applied in any learning context. The Joint Research Centre of the European Commission contributed to bridging the gap between experts and other stakeholders for a shared definition of green competences through this framework. The framework identifies a set of sustainability competences, divided across four interrelated competence areas, as shown in the below figure.



Figure 1. GreenComp Areas and Competences

The European Commission has encouraged Member States to use the framework as a reference when introducing educational initiatives on sustainability.

This report provides an overview of the outcomes and recommendations arising from the desktop, survey and interview-based research undertaken with VET educators and trainers and experts in the area of education in sustainable development. The research was undertaken in the five partner countries, with questions and responses mirrored across the surveys and interviews, to facilitate analysis of similar data and responses, in the areas of current practices, strengths, weaknesses, opportunities, challenges, recommendations.

The report is presented in 10 key sections including the methodology undertaken in this research, Sustainability Education in VETs, VET systems in Europe, Sustainable Education policies, challenges and barriers, best practice and recommendations.



III. Methodology

This comparative report is based on the results and outcomes of the National Reports of the case-study countries: Ireland, Italy, Greece, Romania and Spain. The National reports followed a mixed method approach, using interviews with those involved in vocational education and a review of the policies implemented by the government. In this way, a complete picture of the state of sustainability in Vocational education can be seen.

The research strategy employed in this study a mixed-methods qualitative approach, combining desk research with interviews with Vocational Education and Training (VET) experts to investigate the integration of sustainability competencies in the project partners VET sector.

For this research, document analysis and semi-structured interviews were used. Particularly, the document analysis involved the revision of national educational guidelines, policy documents, curricula, syllabi, and research studies, to address a number of research questions:

- a. What are the current practices and policies for developing GreenComp sustainability competencies in VET in the country?
- b. How do national educational guidelines address integrating sustainability competencies in VET curricula and courses?
- c. What government policies and initiatives are in place to promote the development of sustainability competencies in VET?
- d. To what extent are sustainability competencies integrated into the country's VET curricula and syllabi?

In addition, semi-structured interviews were conducted with VET experts to gather their perspectives on sustainability education in the national VET system. A semi-structured questionnaire was used an interview guide for the researcher. Certain predetermined questions were prepared to guide the interviews and ensure that the research objectives were addressed. However, additional questions arose during the interviews as unexpected insights and information emerged.

The research utilized purposive sampling, a type of non-probability sampling technique, to establish the sample for the study. In accordance with this approach, individuals were selected based on their knowledge, relationships, and expertise related to the research topic (Freeman et al., 2007). For this particular study, sample members were chosen due to their direct involvement and experience in the phenomenon being investigated, as well as their significant work background in vocational education and training and active participation in sustainability education.

The data collected from the desk research and interviews were subjected to qualitative data analysis techniques. Thematic analysis was employed to identify recurring themes, patterns, and insights related to the integration of sustainability competencies in VET. The findings were organized, interpreted, and presented in this research publication, contributing to the understanding of current practices, challenges, and opportunities in sustainability education within the VET system.

The co-design of this research was done following a number of steps:



1. Selection of a group of stakeholders;
2. an online survey;
3. For a deeper analysis a number of semi-structured interviews were conducted.
4. Analysis of policy and operational documents on sustainable education at national level;
5. Identification and elaboration of case studies;
6. Partners drafted National Reports
7. Compilation of Comparative Report.



IV. Sustainable Education in VET: An Overview

This section outlines the current sustainable education in the context of VET and explains the relevance of sustainable education in addressing current challenges.

Ireland:

Green Schools and Green Campus is an initiative which aims to bring everyday sustainable practices into education settings. Available to all levels of educational institutions, Green Schools encourages students to work toward a sustainable goal with a reward of a recognised certification upon completion of the green school's initiative.

Green Skills for Further Education and Training (FET) is a document which sets out the key aspects of the need for the development of skills to encourage a green economy in the future informed by the Osnabrück Declaration on Vocational Education and Training, Green Skills for FET 2021- 2030, outlines the key aspects of green skills and green skills place in a sustainable society. To create green skills in FET, education on climate and sustainability is required, and training of those working in construction on green technologies is also provisioned in the strategy.

ESD to 2030, the second national strategy on education for sustainable development is a plan to introduce sustainability education into the wide variety of education setting in Ireland. The strategy aims to aid in the provision of supports given in education to direct the sector to a more sustainable future to 2030. With cross level and institutional input, primary, secondary, third level and continued education organisations will stride towards increasing and developing their sustainability education. Vocational education is mentioned as a target which aims to create equal opportunities for all who wish to enter vocational and higher education.

Italy:

The forecasts show that the demand for green competences will be transversal to the different professions and economic sectors. Green and digital transition processes will continue to play an important role in the labour market, increasing the demand for green competences in the next 5 years.

Latest research (UNIONCAMERE & ANPAL, 2022) shows that almost half (47.4%) of the 4.2 million green job positions opened in 2022 remained vacant, marking an increase of 6.8% compared to 2021. The difficulty of finding professionals with green skills has increased from 33.8% in 2021 to 41.5% in 2022, registering a growth of almost 8 percentage points in just 12 months.

Greece:

Environmental education (EE) was first established in Greece in the late 70s, but the biggest advancements came in the 90s with a law (1892/1990(φκεκ 101 τ.Α31-07-1990) that introduced EE as part of the programmes of secondary schools, aiming to raise awareness of environmental issues among students.

Under the same law, centres now called Education Centres for Environment and Sustainability (ECES) were established. Today 54 ECESs exist throughout Greece, being responsible for the design and implementation of Sustainable Development programmes for Primary, Secondary and Tertiary Education, the organisation of



training sessions for teachers and those interested and the provision of special programmes on environmental education issues ([Kaloï, 2020](#)), ([Georgantas, 2023](#)). In addition, Environmental Education Officers were appointed in 132 Greek Primary and Secondary Education Districts. These were experienced teachers in EE and each EE Officer coordinated, monitored and supported the teachers who implemented extracurricular projects in the schools of her/his district ([Flogaitis et.al., 2018](#)).

In 2009, the "Sustainable School Award" was established. The formalization of the Sustainable School (SS) in Greece took place during the school years 2010 – 2011 with 140 schools registering across the country. All registered schools cooperated with non-governmental voluntary organizations and participated in activities in the local community.

For the school year 2023-2024, the Ministry of Education and Religious affairs promotes a new learning program (LP) "Environment and Education for Sustainable Development" (EESD), by integrating it in the mandatory curriculum in primary, including pre-school and only lower secondary schools. The EESD program promises to benefit students in several ways like, teach them responsibility and love for their living environment, while enhancing empathy and a range of metacognitive skills such as creative thinking and problem solving. The uniqueness of this LP is that it does not have specific hours in the curriculum but is mainly achieved through diffusion in the taught subjects (multidisciplinary model).

Romania:

In the Romanian education landscape, Vocational Education and Training (VET) and the integration of Environmental Education practices represent both aspirational directions and challenges in implementation. To strengthen VET, consistent efforts are required to change societal attitudes, encourage industry collaboration, and ensure the quality of training programs.

Environmental education in Romania is guided by both national and international policies. The Romanian Ministry of Education and Research has taken steps to incorporate environmental themes across various subjects in the curriculum, ensuring that students are exposed to concepts of biodiversity, climate change, and conservation from an early age. Additionally, Romania is a signatory to international agreements such as the Aarhus Convention, which emphasizes public participation in environmental decision-making and access to environmental information.

Spain:

The Vocational Training sector in Spain is the area of training that has experienced the greatest growth, from 493,769 enrolled in the 2001-2002 academic year to 891,906 in the 2019-2020, which represents a growth of 74%.

This increase has also been possible thanks to a political support to Vocational Training, creating a new integrated VET model, based on qualification and competences, linking to the needs of companies, but also to the new demands emerging from the existing changes in the economy, where two simultaneous processes converge: digitalization and ecological transition that are changing the economic models and that will affect in a transversal way all sectors and professions of the economy.



These challenges facing the economy are reflected in the preamble of the Organic Law 3/2022 of 31 March on the organization and integration of Vocational Training (BOE of April 1) the Spanish Vocational Training system wants to become a major ally to successfully address, from the workplace, both the digital economy, as the ecological transition and fight against climate change.

V. VET Systems in European Countries and the Integration of Sustainability Initiatives and practices

Ireland:

Ireland has transformed its VET system from standalone institutions in the early 1900s's to an integrated model within mainstream education, addressing historical biases against VET. Sustainability initiatives like Green Schools are prominent within the Irish education system giving rise to more knowledge and awareness of sustainability amongst both teachers and pupils in areas of energy conservation, biodiversity, and waste reduction. Sustainability initiatives such as Green Schools promote environmentally responsible practices, covering energy conservation and biodiversity.

Italy:

Italy's VET system adopts a regionally diverse approach, with a growing emphasis on green competences to meet labour market demands and sustainability transitions within the economy. Italy offers various VET courses with a growing focus on green competences and sustainability education to meet labour market demands. In 2019 Italy re-introduced civic education as a subject in the first and second cycles of education. Schools must provide at least 33 hours of transversal civic education teaching on three main conceptual cores including sustainable development, environmental education, knowledge and protection of heritage and territory. Italy aligns VET with sustainability principles and green technologies, recognising the need for green competences.

Greece:

Greece has a long history of environmental education dating back to the 1970's and have established Environmental Education Centres (ECES). There is a strong commitment to sustainability practices incorporated into the educational system at all levels. Greece's diverse VET system supports adult learners and workforce development, with a strong emphasis on sustainability through initiatives like Green Schools and Green Campus, encouraging students to work toward recognised certifications. Greece promotes sustainability through initiatives like Green Schools, encouraging students to work toward recognised certifications.

Romania:



Romania recognises the importance of environmental education and sustainable entrepreneurship within VET but faces challenges in implementation and changing societal perceptions. Romania is working to integrate environmental education and sustainable entrepreneurship education, addressing challenges such as outdated curricula and limited resources. Romania is working to integrate environmental education and sustainable entrepreneurship education, addressing challenges such as outdated curricula and limited resources.

Spain:

Spain's VET sector has experienced substantial growth, aligning with the digital economy and ecological transition within the country. It emphasises future proofing and preparing the workforce for green jobs and sustainability challenges that may arise by encouraging sustainable practices through vocational programmes. Spain's VET system aligns closely with the digital economy and ecological transition, emphasising green job preparedness and sustainability education. Spain recognises the importance of ecological transition and green jobs, emphasising sustainability education within VET.

The future of sustainability integration

The successful integration of sustainability into VET requires ongoing investment, curriculum revisions, teacher training, industry collaboration, and a shift in societal attitudes. Progress depends on a steadfast commitment from policymakers, educators, industries, and civil society to navigate challenges and create an education system that equips students for the workforce while nurturing environmentally responsible citizens.

Each country demonstrates a shared recognition of the importance of VET and sustainability education in preparing the workforce for a rapidly changing world. Collaboration, innovation, and dedication to sustainable practices are essential for shaping the future of VET in these diverse European nations.



VI. Sustainable Education Policies

This section compares the sustainability-related policies and initiatives in different European partner countries and outlines the legal frameworks, strategies, and funding mechanisms for sustainable education in VET.

Ireland:

Sustainability has been increasingly incorporated into Ireland's education system. The Irish education system has taken on changes to curricula to allow for sustainability to be more widely implemented. ESD to 2030 is a Framework which aims to increase the contribution of the education sector to a more sustainable future by 2030. Impacting all levels of education from primary to secondary, tertiary, and further and vocational. One of the main objectives of the ESD to 2030 strategy is to ensure sustainability practices are rooted into government policy and practices in the future. However, there is currently limited information on the prospect of government policy directing sustainability education in Ireland. Despite this, ETBI (Education Training Board Ireland) encourage the uptake of sustainability competences in education through initiatives such as Take 1 which aims to embed the UN SDGs (Sustainable Development Goals) in education by students, educators, and trainers.

Italy:

Some of the key recent developments in the Italian formal education system are:

- **Charter on Environmental Education and Sustainable Development.** The Charter is a programme of medium and long-term commitments on education and training, from biodiversity to climate change and guidelines for schools based on a global educational approach to sustainable development, taking into account the Global Action Program on Education on sustainable development of the UNESCO Education Strategy 2014-2021¹⁵: *Interdisciplinarity, Acquisition of values, Critical Thinking Development and Problem-Solving Research, Multiplicity of methodologies, Shared and participatory decisions, The importance of the local context.*
- **National Strategy for Sustainable Development**¹⁶ aims, to "ensure in every educational sphere (including vocational training) interdisciplinary and participatory pathways geared towards disseminating knowledge, skills, attitudes and lifestyles oriented towards sustainable development, including by investing in teacher training, curriculum integration education programmes, and respect for the principles of sustainability and social inclusion by the educational and training venues".
- **"Pathways for Transversal Skills and Orientation"**, offers opportunities to experience orientation activities, based on active, experiential and project-based learning approaches, in institutions or private companies. This can represent a valuable tool to support students in experiencing and experimenting with sustainable practices and develop their sustainability competences through active learning experiences.
- Italy re-introduced **civic education** as a subject in its own right including in school-based upper-secondary VET. One of the three main conceptual cores is sustainable



development, environmental education, knowledge and protection of heritage and territory.

- The Ministry of Education launched an implementation plan for the objectives of the 2030 Agenda, namely ***Piano RiGenerazione Scuola***¹⁸ (literally, *Re-Generation School Plan*), that has become a part of the schools' educational offer, including upper-secondary vocational institutions and schools have been invited to include in the school curriculum, activities relating to the themes of ecological and cultural transition.
- the ***National Plan for New Competences*** (*Piano Nazionale Nuove Competenze*)¹⁹, aims to “reorganise the training of workers transition and unemployed workers, through the strengthening of the vocational training system and the definition of essential quality levels for upskilling and reskilling activities”. Hence, it represents a strategic coordination framework for upskilling and re-skilling interventions aimed at addressing the needs for new skills resulting from digital and green transitions and the effects of the COVID 19 pandemic.

Greece:

Recent reforms in Sustainability education include the learning program on “Environment and Education of Sustainability Development” (EESD) in pre-school, primary and lower secondary education schools, to be implemented in the school year 2023-2024. VET curricula and courses follow similar guidelines as the rest of higher secondary education schools. ESD is not properly implemented in the curricula of secondary education. A pilot program named "A New Beginning in the EPALs - Action Plans" was implemented and extended to all VET schools in Greece and more than 1000 action plans have been produced with more than 40,000 students being involved.

The Science Dissemination Centre & Technology Museum "NOESIS", a cultural and educational institution of General Governance, has been appointed responsible for the implementation of Action Plans and Good Practices by all Vocational High Schools of the country (Φ25α/1956/Δ4) and supports the Action Plans in the framework of the Operational Programme "Human Resources Development-Education and Lifelong Learning" of the NSRF 2014-2020.

The National Recovery and Resilience Plan "Greece 2.0" was adopted on 13 July 2021 and included investments and reforms, distributed across 4 pillars: Green Transition, Digital Transition, Employment-Skills-Social Cohesion, Private Investment and Transformation of the Economy (greece20.gov.gr).

Within this context the National Employment Service (DYPA) in cooperation with the Training and Lifelong Learning Centres of the Greek Public Universities, as well as with licensed Training and Lifelong Learning Centres that meet specific quality assurance criteria, provides training programmes on a wide range of choices in modern, high-demand training subjects focusing on digital and "green" skills, to private sector employees, employees in all sectors of the economy and to those seeking employment.

Training topics in "Green" skills include:

- Application of New Technologies in Natural Disaster Management
- Circular Economy
- Smart Building Programming Technician
- Environmental Protection and Product Recycling



- Renewable Energy Sources (RES)
- Waste Management
- Specialist in circular economy applications in the primary and secondary sector

Romania:

In recent years, Romania has recognized the importance of integrating sustainability competencies into its formal education system. One significant evolution is the integration of sustainability competencies across various subjects within the curriculum. Concepts related to environmental protection, climate change, social equity, and responsible consumption are being introduced at different educational levels. This approach helps students understand the relevance of sustainability in diverse contexts and fosters a holistic understanding of the challenges and opportunities associated with it.

Romania has started investing in teacher training and professional development programs focused on sustainability education. Collaboration between educational institutions, governmental bodies, non-governmental organizations, and the private sector has gained prominence. While the integration of sustainability competencies is promising, challenges remain.

Spain:

In Spanish legislation, the General principles, Article 3 letter l, the new regulation states, "the permanent updating, agile adaptation and proactive and anticipatory detection of changes and emerging needs in the productive sectors, in particular those associated with digitalization, ecological transition, environmental sustainability, territorial innovation, health and attention to people".⁵ The Law opens three specific areas for the commitment of vocational training for employment in the environmental sector.

1. Jobs related to the mitigation of emissions.
2. Jobs related to adaptation to climate impacts.
3. Jobs related to a culture of sustainability, with reference to environmental education, sustainable leisure and tourism, energy saving and efficiency consultancy.

Within the Spanish vocational training system there are 26 professional families. However, only one professional family incorporates the term environmental, being the professional family of Safety and Environment. Currently there are 40 training programs related to green jobs within 5 professional families.

The research service of la Caixa published a report in 2022⁷ in which it pointed out the changes in the profiles of the green economy sector underlining four important impacts for the Spanish economy:

1. General impact on all professional profiles incorporating training in sustainability.
2. Specific impact to incorporate in traditional and very different professional activities the skills needed to operate with new elements of the green economy.
3. Impact on the adaptation of classic profiles to the sector.
4. Impact on the capacity to adapt to changes.



These impacts point to sectors where there will be a reorientation of employment towards cleaner production rather than an increase or decrease, being necessary the adaptation of vocational training policies and integrated active employment policies for the existence of a recycling and improvement of the qualifications of the employed population in these sectors.

However, changes are being incorporated into vocational training in Spain, seeking closer collaboration between the training offer and the real needs of companies, giving rise to collaborative initiatives between the private sector and the education sector. This collaboration is reflected in the article 84 of the Organic Law 3/2022 “Collaboration in the training action”.



VII. Teacher Training and Capacity Building

An examination of the training programs and professional development opportunities for VET teachers related to sustainability will be outlined in this section and discuss the role of teacher training in promoting sustainable education.

Ireland:

In terms of teacher training 62.5% of respondents felt that staff and tutor training was the most important part of enhancing the development of the sustainability education process going forward. Ensuring the educators are sufficiently knowledgeable of the needs of sustainability education allows for a leaching of information to students. 18.75% would promote the necessity of increased training for educators and tutors as a method of innovation in the future. Ensuring educators remain informed of changes to sustainability practices and new innovations is essential to the uptake of sustainability competences in Vocational Education.

In relation to capacity building almost 50% of the respondents felt that there was a disjointed approach to the rollout of the sustainable competencies. With more of an emphasis on long term courses, a greater drive to integrate sustainable competences into short term courses or micro qualifications may aid in the integration of sustainable competences into VET allowing greater accessibility to sustainability education for a greater audience. Increasing sustainability education in short term educational programmes would ensure a larger cohort of students can access quality education with an emphasis on sustainability.

While in many existing courses' sustainability competences may be taught, they are not implemented into the running of the course. It was also noted that while the integration of sustainability competences into VET is increasing, the difficulty of further integration into existing and fully operational curriculum is particularly difficult. An inability to change curricula has been observed by experts. Concern over an inability to shift to change the expected learning outcomes from curricula in education to allow greater involvement of sustainability education, has inhibited the teaching of sustainability competences in Ireland's education system.

When planning to implement sustainability competences, weaknesses such as a lack of accessibility to information for educators can be a barrier to delivery. It was also noted that there is a need to change the language used to describe sustainability and must be adapted at a 'grassroots' level to allow for greater uptake and participation from educators.

Lack of resources also plays a part. 50% of respondents believe the greatest weakness in sustainability education and training comes from a lack of resources diverted to the rollout of sustainability education in VET. The resources most lacking are funding sources for sustainability education and dedicated training for educators, tutors, and teachers. Going forward, changes will be required to enable the wider use of sustainable competences in VET such as increased resources, support, and infrastructure. Going



forward, changes will be required to enable the wider use of sustainable competences in VET. Resources, support, and infrastructure are vital to aid in sustainable development.

Italy:

In terms of teacher and trainer training programmes 80% of respondents emphasised the necessity for such programmes, reflecting a shared understanding of educators' pivotal role in advancing sustainability education. This response underscores the importance of equipping educators with the tools and knowledge required to effectively deliver sustainability education, aligning their pedagogical practices with evolving sustainability challenges. 67% of respondents identified limited opportunities for specific training for teachers and trainers, echoing a pressing concern regarding the need for comprehensive professional development that equips educators with the pedagogical tools necessary to support sustainability competencies' development effectively.

The importance of educators' preparation was also stressed, addressing the need for integrating sustainability into teachers and trainers' education, as well as for promoting a specific qualification for sustainability educators.

A notable 73% foresee an increase in hands-on experiential learning, valuing practical engagement to provide students with insights into sustainability challenges and solutions that extend beyond theory. Additionally, 33% of participants emphasized the better integration of sustainability competences within vocational curricula, underscoring the need for cohesive development across disciplines. This challenge emphasizes the importance of a curriculum that consistently addresses sustainability competences, reflecting a holistic vision for the future of sustainability education in Italy.

There was also the observation that Italian vocational teachers and trainers find "Difficulties in integrating innovative models for the development of transversal competences on obsolete training models based on top-down knowledge transmission". Indeed, over half of the respondents (53%) flagged the 'lack of clear guidelines or specific directives to understand how to integrate these competencies into the curriculum.' This deficiency underscores the necessity for structured frameworks that guide educators in seamlessly integrating sustainability themes within their teaching plans.

The lack of adequate resources was also highlighted with 47% noting the 'lack of educational resources, teaching materials, and tools.' These concerns highlight educators' practical challenges in securing the necessary tools and materials to convey sustainability concepts effectively. Approximately 60% underscored the need for increased funding for program development and teaching resources. Adequate financial support is vital to facilitate the creation of comprehensive and engaging sustainability-focused curricula that resonate with learners.

Another weakness identified in the capacity building were the difficulties in defining and evaluating sustainability competencies. This underscores the intricacies of measuring abstract yet crucial skills such as sustainability awareness, posing a need for refined evaluation methods. In addition, there is the importance of recognising and providing incentives for educators' efforts in advancing sustainability competencies.

**Greece:**

The interviewees agreed that efforts have been made to equip trainees and trainers with the knowledge, skills and mindset needed for a greener and more sustainable economy and society. The weaknesses and limitations pointed out by the respondents were, the lack of an established framework, lack of resources, lack of specific or updated content and instructions for teachers and the lack of proper training of educators resulting in a lack of teachers with sustainability expertise or qualified teachers to organise the programmes. There is also a lack of awareness of the green labour market. The main necessary resources, support and infrastructure mentioned by the respondents were properly trained educators and trainers, EU and national funding, and a separate course on sustainable development in the school's curriculum.

In terms of capacity building the benefits of sustainability education are acknowledged such as the creation of a new industry and market with new jobs. Environmental Education (EE) in Greece includes the recent program on "Environment and Education of Sustainability Development" (EESD) which was extended to all VET schools in Greece. Due to the specific nature of vocational schools, particular attention was paid to foster innovation, develop creativity and promote entrepreneurship. The Action Plans (projects) of the programme are mainly addressed to the students of the first grade of the VET schools and promote innovative creative projects related to science, technology, culture, rural economy, health, smart cities, energy saving, environmental protection, accessibility for people with disabilities, etc.

ESD is not properly implemented in the curricula of secondary education. However, in 9 VET schools of the country a pilot program named "A New Beginning in the EPALs - Action Plans" was implemented in the school year 2017-2018. The Action Plans aim to develop personality, sociability, skills and cooperation between students and teachers. The main objectives are the development of hard skills, i.e. the transfer of knowledge from the workshops to the group work of the action projects and the development of soft skills problem solving through cooperation which strengthens communication, critical thinking and self-confidence.

Romania:

In Romania, there are not many institutions that provide training for teachers and trainers on the topic of sustainability. The teaching staff do not have much knowledge about best practices in the field. Although the curriculum has been improved in some institutions, there is weak monitoring of the results, which leads to difficulties in taking measures to increase efficiency. Often, teachers do not have received adequate training to teach sustainability competencies effectively, therefore, there is a lack of knowledge for integrating these concepts.

Providing teachers with the training and tools required to effectively deliver sustainable entrepreneurship education is crucial. Teachers need to be adept at blending traditional business concepts with innovative and sustainable practices, fostering critical thinking and problem-solving skills among students. A pragmatic strategy that involves collaboration, teacher training, curriculum adjustments, and long-term evaluation is essential to bridge the gap between ambitions and practical realities.



Recognizing this importance of well-prepared educators, Romania has started investing in teacher training and professional development programs focused on sustainability education. These new teachers' trainings are not yet a very common practice among teachers, but the tools do exist to effectively communicate sustainability concepts, engage students in experiential learning, and incorporate real-world examples into their teaching. It's necessary to provide better training for teachers, mentors, and trainers in this area, then integrate this information into practices and programs, and evaluate the effectiveness of these practices. These practices are efficient in developing systemic and critical thinking skills, as well as the ability to act in favour of the planet.

Some VETs have adapted the curriculum. There is a national recommendation for integrating sustainability competencies across various disciplines and fields of study. This is still at the beginning and the full adaptation of curricula requires teachers' preparation, which is not very well approached.

Education in Sustainability is recognised as being important as it improves critical thinking skills, students learn to analyse situations from different angles and are able to develop innovative solutions. They also learn about responsible resource use which make them understand and have consideration of environmental impacts. At community level, they understand the social, economic, and environmental issues impacting on a global scale. Students, the future employees with sustainability competencies can contribute to business and business image, making ethical decisions and supporting cost-saving initiatives.

The main necessary resources, support and infrastructure mentioned by the respondents are:

- Educational Materials accessible, ready to use with lessons plans.
- Programs for training for trainers.
- Technology resources for online learning and for virtual simulations to demonstrate the need for sustainability competencies.
- Collaboration with industries to provide real-world examples and practical application.
- Equipped laboratories for experiential learning related to sustainability.
- Clear policies with targets and indicators at the institutional and governmental levels supporting sustainability education.
- Networking opportunities through events that connect students, educators, industry with sustainability experts.

Spain:

The educators' responses highlight several common points about the strengths and positive aspects of existing approaches and practices for sustainability competencies development in VET. Some educators point out that the effectiveness of these approaches largely relies on the instructor delivering the training. There is a widespread perception among educators that the current practices for sustainability competencies development are not subject to thorough evaluation, which may limit the understanding of their true effectiveness and impact.



Educators' responses reveal a consensus that there is a lack of dedicated resources, support, and infrastructure to effectively enhance the development of sustainability competencies in VET. The common sentiment is that currently, such resources are limited or non-existent with an absence of substantial support, or the failure to get existing resources to the educators. They suggest various innovative approaches and strategies for advancing the development of sustainability competencies in VET such as comprehensive training plans focused on sustainability for teachers.

The importance of training for teachers is emphasised, offering practical methodologies that incorporate real-world scenarios. Starting with achievable actions is advised, fostering confidence and enthusiasm among educators to gradually change daily behaviours. Additionally, the need for practical and immersive training that connects students with real-world problems is stressed. The significance of practical training, hands-on experiences, and methodologies that directly address sustainability challenges is emphasised.



VIII. Industry Partnerships and Work-Based Learning

The collaboration between VET institutions and industries for sustainable education will be assessed in this section.

Ireland:

37.5% of interviewees highlighted the need for greater collaboration and communication in the roll out of sustainable competences across several organisations and sectors. Collaboration with the community, both national and international were deemed essential, while connectivity to increase inclusivity was also remarked on. Connectivity and collaboration with industry and businesses would allow for greater engagement from a larger cohort while allowing students and industry to gain practical sustainability experience.

When asked what collaboration and partnership opportunities exist or should be fostered in the development of sustainability practices in VET, 69% of respondents indicated that working with other members of the educational community would benefit sustainability education. Members of the community included ETB'S (Education and Training Boards), The Department for Education, other VET tutors, and other Higher Education institutions. Collaboration with the EU, the Cities Learning Network, and Policy makers were all indicated to be helpful prospective collaborators. Collaboration with local businesses and industry was also a key theme indicated by experts. 25% of interview respondents believe working with businesses in the local community would be of benefit to the enhancement of sustainable competences in education and training.

Italy:

The interviewees stressed the crucial role of collaboration and partnerships in enhancing the development of sustainability competencies in VET. Particularly, the respondents identified the need for (a) private sector engagement, (b) civil society involvement, (c) international partnerships for knowledge exchange, and (d) research and academic collaborations. 33% of the interviewees stressed the importance of engaging stakeholders across academia, industry, and institutions to create a comprehensive learning ecosystem that nurtures sustainability competencies.

Notably, 93% of respondents emphasized the crucial role of partnerships between VET entities and the private sector, recognizing this collaboration as foundational for shaping the country's sustainability competences landscape. This partnership-driven approach is expected to align education with real-world insights and the needs of the labour market.

60% underscored the 'lack of synergies between schools, training institutions, and actors in the job market and non-profit sector.' This challenge highlights the importance of fostering meaningful connections between educational institutions and stakeholders beyond academia to enrich the learning experience. A significant 73% of respondents highlighted the need for collaboration with external partners such as companies, industries, non-profit organizations, and other stakeholders valuing the direct involvement from the business sector to VET. This response resonates with the importance of connecting VET institutions with real-world entities to provide learners



with practical insights, experiences and applications rooted in sustainability principles and align education with the evolving demands of a greening labour market. 60% of respondents underscored the 'lack of synergies between schools, training institutions, and actors in the job market and non-profit sector.' This challenge highlights the importance of fostering meaningful connections between educational institutions and stakeholders beyond academia to enrich the learning experience. Engagement with NGOs and civil society entities are believed to introduce a holistic perspective, encouraging learners to view sustainability as an integral aspect of community well-being.

Most of the respondents (87%) stressed the importance of international exchanges of good practices with other countries, recognising the potential to share experiences, strategies, and best practices internationally. Such exchanges can enrich VET curricula by infusing diverse viewpoints and global perspectives on sustainability. Respondents (67%) recognised collaboration with research institutes and universities as a significant avenue. This signals the desire to bridge the gap between academia and practice. Collaboration with research institutions ensures that sustainability competencies are rooted in evidence-based insights, fostering a well-rounded understanding of complex issues.

Greece:

The creation of thematic networks at regional, national and international level are established in Greece and deemed important. A number of school units participate in these thematic networks, functioning in a supportive way to the participating school units, ensuring a continuous flow of information and training for teachers, providing appropriate educational resources and ensuring a stable cooperation with experts. There is also the development of partnerships between the Ministry of Education and governmental and non-governmental bodies. This relationship contributes to the more efficient operation and organisation of the Environmental Education programmes. In addition there are partnerships in Greece between international educational and training institutions.

The main collaboration suggested by the respondents were with universities and professionals specialising in sustainable solutions, but also with the local community. However, some respondents expressed concern that there were no opportunities for cooperation and that a network should be created with organisations and professionals working on sustainable development.

Greater cooperation between institutions and the local community and linking with environmental organisations and university departments were also suggested. Some respondents also thought that private and public bodies should develop cooperation with education and training institutions in order to incorporate the latest developments in sustainability in teaching and learning, and indeed across the whole range of their activities. In general there should be cooperation with higher education institutions and with professionals for the transfer of knowledge and technology.

Romania:



Collaboration between educational institutions, governmental bodies, non-governmental organizations, and the private sector has gained prominence. Partnerships enrich educational experiences by providing access to expertise, resources, and real-world case studies that align with sustainability competencies. Currently the main collaborations are with NGOs and universities.

A number of points were made in the survey responses in relation to collaboration.

- Partnership with industries could provide practical application of sustainability concepts. Professional associations can guide the integration of industry-specific sustainability practices. Private companies should be involved more to present their perspective and declare their support because they are a very credible source of practical experiences.
- Support and guidance from governmental bodies would help integration of sustainability into education.
- NGOs already contribute with resources, expertise and non formal activities during the national program “Green week” to enhance sustainability education. Environmental agencies focused on environmental protection have the capacity to offer expertise and resources for sustainability initiatives, but it needs to be an integrated approach.
- Very often, universities share best practices and open the doors for collaborative projects on topics of sustainability education. This initiative needs a structured approach in order to produce real impact. A network of schools and educational institutions would be very helpful to share good practices, experiences and resources.
- Partnerships with international organisations, mainly through KA2 Erasmus projects bring diverse perspectives, good practices and educational materials for sustainability initiatives.
- Local communities and local authorities need to create context and allocate space for sustainability projects.

Spain:

Educators highlight several collaboration and partnership opportunities to enhance the development of sustainability competencies. A common suggestion is to collaborate with sustainable companies and environmental or sustainability consultancies, leveraging their practices as examples in training courses. The partnership potential lies in teaching successful company models and implementing good practices, as well as creating partnerships that can contribute expertise and guidance. Learning from advanced entities or companies is proposed as a way to transition from reflection to tangible action. Educators emphasize the importance of training teachers and raising awareness in workplaces, potentially through cooperative efforts. In general, multilevel cooperation involving certification bodies, companies, NGOs and public administrations is identified as beneficial. Ultimately, educators stress the necessity for more training that is closely linked to daily life practices. In conclusion, fostering partnerships with sustainable companies, consultancies, NGOs, and other stakeholders, alongside



enhancing teacher training, is a promising approach to advancing the development of sustainability competencies in VET.



IX. Challenges and Barriers

This section identifies common challenges and barriers such as resource constraints, resistance to change, and lack of awareness faced by European countries in implementing sustainable education in VET.

Ireland:

Experts believe a lack of meaningful change is resulting in challenges to the rollout of sustainability education in VET. 18.75% attribute this lack of meaningful change to the slow development of sustainable competences in VET and a lack of uptake. A lack of tutors and educators, dedicated training for educators, funding and vital resources used in education are also prominent concerns among 31.25% of respondents.

25% highlighted the lack of interest and awareness as an obstacle to sustainability education in VET. With a lack of awareness from staff, students, and the public alike, interest and understanding has posed a serious challenge to the movement to a more sustainable education environment in the future. Other weaknesses in the current practices identified include barriers to accessibility, the need for language adaptation and the inability to change existing curricula and to enhance sustainability competencies.

Italy:

The insights provided by respondents highlighted six distinct clusters of concerns:

1. Training and Support for Educators:

67% of respondents identified limited opportunities for specific training for teachers and trainers, echoing a pressing concern regarding the need for comprehensive professional development that equips educators with the pedagogical tools necessary to support sustainability competencies' development effectively.

2. Lack of Synergy and Collaboration:

Regarding collaboration, 60% underscored the 'lack of synergies between schools, training institutions, and actors in the job market and non-profit sector.' This challenge highlights the importance of fostering meaningful connections between educational institutions and stakeholders beyond academia to enrich the learning experience.

3. Clear Guidelines and Resources:

Over half of the respondents (53%) flagged the 'lack of clear guidelines or specific directives to understand how to integrate competencies into the curriculum.' This deficiency underscores the necessity for structured frameworks that guide educators in seamlessly integrating sustainability themes within their teaching plans.

4. Financial and Educational Resource Constraints:

53% identified the 'lack of adequate financial resources,' and 47% noted the 'lack of educational resources, teaching materials, and tools.' These concerns highlight educators' practical challenges in securing the necessary tools and materials to convey sustainability concepts effectively.

5. Defining and Evaluating Competencies:



47% highlighted the difficulties in defining and evaluating sustainability competencies. This underscores the intricacies of measuring abstract yet crucial skills such as sustainability awareness, posing a need for refined evaluation methods.

6. Recognition and Appreciation of Educators:

7% touched upon the lack of appreciation for teachers. This sentiment underscores the importance of recognising educators' efforts in advancing sustainability competencies.

Greece:

The barriers encountered by the VET experts are mainly lack of experienced trainers, motivation of trainers and trainees, lack of funding and lack of awareness of the green labour market. In one of the responses it was suggested that more EU and national funding was needed in this area.

The weaknesses and limitations pointed out by the respondents were, the lack of an established framework, the lack of proper training of educators and the lack of motivation and interest among staff and students. Education in Sustainable Development is not properly implemented in the curricula of secondary education. Comments from respondents on this included the need for specific practices and formal programmes for sustainability in VET. Among the respondents' comments were that motivation was based on the personal willingness of the teachers to organise these activities with whatever knowledge they have and with whatever resources are available.

The VET experts felt that the impact of sustainable education was still very small and that there should be better information about advantages in the labour market about green skills and sustainability knowledge. It was felt in some of the comments that other countries are much more advanced in this area.

Romania:

The current landscape presents challenges. The traditional educational framework, geared toward conventional business models, often lacks the necessary flexibility to accommodate the interdisciplinary nature of sustainable entrepreneurship. Integrating subjects like environmental science, social impact assessment, and ethical leadership requires curriculum revisions and specialised teacher training. While there's recognition of the importance of environmental education, the implementation faces challenges. Despite the intention to include environmental topics across subjects, the emphasis on standardised testing often sidelines such integrations.

Furthermore, sustainable entrepreneurship demands a practical learning approach, encouraging students to engage with real-world challenges and opportunities. The successful integration of sustainable entrepreneurship education necessitates a multifaceted approach. Firstly, collaboration between educational institutions, sustainable businesses, and relevant governmental bodies is essential to develop curricula that reflect the realities of the business world while embedding sustainability principles. It seems that industries within Romania do not prioritise sustainability,



therefore, students cannot see a direct connection between sustainability competencies and job opportunities. There is also the challenge in establishing collaborations with industry to identify real-world applications.

Secondly, providing teachers with the training and tools required to effectively deliver sustainable entrepreneurship education is crucial. Teachers need to be adept at blending traditional business concepts with innovative and sustainable practices, fostering critical thinking and problem-solving skills among students. Often, the teachers do not have received adequate training to teach sustainability competencies effectively, therefore, there is a lack of knowledge for integrating these concepts. Traditional teaching methods and resistance to change can make it challenging to introduce new teaching approaches and topics like sustainability along with a resistance to change among some educators. There is also the challenge of limited recognition or rewards for educators and institutions that prioritise sustainability.

Limited resources, outdated curricula, and a lack of specialised teachers are common hurdles. Most of the respondents mentioned the difficulties in adapting curricula and assessment methods for teaching and developing the sustainability competencies. The existing curricula does not include sustainability topics and is difficult to update to incorporate sustainability competencies. Moreover, these concepts require time and resources making the integration difficult. Once introduced in a topic, or lesson plan, there is a need for assessing. Developing appropriate assessment methods for evaluating sustainability competencies is more complicated and it can be difficult to measure student learning outcomes.

Spain:

The educators' responses converge on several common weaknesses and limitations associated with the current practices for developing sustainability competencies. These range from content scarcity and institutional constraints to the need for educator alignment and the quality of curricular materials, all of which emphasise the complexity of embedding sustainability into VET programs. They also include institutional support, job relevance, pedagogical quality and teacher training, all of which collectively hinder the comprehensive integration of sustainability competencies within VET. A notable issue is the lack of institutional support, which impedes the effective implementation of these practices. Many educators note that these competencies are not deemed essential for employment, creating a gap between training and real-world application. Excessive paper printing emerges as a practical concern, indicative of unsustainable practices within the learning environment.

Moreover, concerns are raised about the quality and meaningful preparation of sustainability education, as well as the absence of clear definition and guidelines. There is a consensus on the necessity of training teachers to effectively deliver sustainability education. A shared observation is that the current approach often remains confined to analytical thinking and fails to induce genuine behavioural change. Additionally, the lack of subject knowledge and minimal support from administrative bodies for training programs are recurring themes.



Educators encounter several common challenges when implementing sustainability competencies within VET programs. These include difficulties in seamlessly integrating sustainability across diverse topics in further training, limited availability of relevant courses, constraints in training duration and agendas, and resistance to deviating from established curricular essentials. Adapting sustainability within formal education modules faces obstacles due to curriculum structures. A significant challenge lies in aligning education professionals with sustainability values to set examples, as internal resistance to change persists, once again the incorporation of a transversal competence such as sustainability lies on the individual educators.



X. Success Stories and Best Practices

In terms of developing sustainability competences each project country highlighted a number of best practices in Europe with examples highlighting the best practices and success stories undertaken throughout Europe in Ireland, Spain, Italy, Romania, and Greece. They help highlight the innovative approaches to sustainability. Sustainability competences are already seen in practice through several diverse initiatives in each country, ranging from green entrepreneurship in Italy, fashion in the circular economy in Ireland, students using their applied knowledge to create an electric vehicle in Greece, school-based programmes that work on having transformative learning envisioning diverse pathways to 2050 in Spain and recycling campaigns to educate local people on the different recycling methods in Bucharest. These initiatives highlight the excellent work already being done on the ground in each country and in each National report there is more detailed examples of ongoing projects that are targeted to developing more opportunities to incorporate sustainable practices within the education networks.



XI. Recommendations

This section provides actionable recommendations for improving sustainable education in VET across Europe. It includes suggested policy changes, capacity-building strategies, and areas for further research.

Ireland:

While there is increasing awareness and discussion about sustainability, much of the work is carried out by individuals, lacking a unified approach. Moreover, certain types of courses, like apprenticeships, lag in incorporating sustainability compared to traditional class-based learning. Integrating sustainability into existing curricula is challenging but needs to be accomplished. Sustainability in education is a new idea, which has required a huge amount of change in syllabi and curriculums throughout Ireland.

In addition, efforts must be made by policy makers, educators, students, and other stakeholders in education. Examples of this include staff and tutor training, funding for resources, collaboration and communication among organisations and sectors.

Italy:

Both the administration of the questionnaire and the review and analysis of the Italian best practices revealed needs, required actions, and suggestions on how to implement new opportunities to support learners in developing sustainability competences. These include the following:

- **Active Student Involvement:** All green skills learning experiences actively involved students, encouraging them to actively participate in the design and implementation of activities, stimulating their curiosity and creativity, and helping them develop a sense of responsibility toward the environment.
- **Interdisciplinarity:** Many of the practices integrated different disciplines and areas of study, combining science, humanities and art subjects. This interdisciplinary approach enabled students to better understand the complexities of concepts related to sustainability and to develop a systemic view to problem solving and the creation of new solutions.
- **External Collaborations:** Green learning experiences often involved collaborations with experts in the field, environmental associations, artists and other stakeholders outside the education and training provider. These collaborations enriched students' experiences and provided an "augmented" perspective with respect to environmental challenges and possible solutions.
- **Use of Innovative Technologies:** the use of innovative technologies and digital tools such as virtual reality and interactive games proved to be of paramount importance



in motivating students and making the 'learning experience more stimulating, exciting, and engaging.

- **Focus on Local Context:** Many learning experiences focused on specific environmental issues present in well-defined local contexts. Students were involved in finding solutions to apply within their own local area and community. This approach deepened the experience and increased the sense of belonging and commitment to the local area.

Greece:

The integration of environmental awareness in education needs to be holistic or targeted in a way in order to increase the student's knowledge on sustainability in such a way that they could change their attitude, ideas, and way of living for the planet's better future. The educators and trainers recommend increased training on the subject to support the needs of their students and be able to provide them with the right content and practical examples for learners to change their behaviour and act for sustainable development. Students need to gain the skills and competences required for a more sustainable future. Students need to be equipped with knowledge on sustainability not only as technical and technological advances but as knowledge of everyday living. Educational systems need to produce responsible, competent and aware citizens that can make amends where previous generations couldn't. There is a need to develop the critical thinking and social awareness of the students and ultimately learning to form connections with others to deal with environmental problems.

Romania:

Efforts are required to change societal attitudes, encourage industry collaboration, and ensure the quality of training programs in order to strengthen VET system. This demands ongoing investment, coordination between stakeholders, and measures to bridge the information gap between students, parents, and educators regarding the benefits of VET.

There is a need for greater resources, updated curricula, and more specialized teachers in Environmental Education. Effective Environmental Education necessitates curriculum revisions, teacher training, and the development of engaging materials that resonate with students. This requires financial commitment and a deliberate shift in priorities within the education system. Additionally, there is a need for commitment from policymakers, educators, industries, and civil society to collectively navigate these obstacles and create an education system that equips students for the demands of the workforce while nurturing environmentally responsible citizens.

The successful integration of sustainable entrepreneurship education necessitates a multifaceted approach. Firstly, collaboration between educational institutions, sustainable businesses, and relevant governmental bodies is essential to develop curricula that reflect the realities of the business world while embedding sustainability principles.



Secondly, providing teachers with the training and tools required to effectively deliver sustainable entrepreneurship education is crucial. Teachers need to be adept at blending traditional business concepts with innovative and sustainable practices, fostering critical thinking and problem-solving skills among students.

A pragmatic strategy that involves collaboration, teacher training, curriculum adjustments, and long-term evaluation is essential to bridge the gap between ambitions and practical realities. Collaboration among different disciplines can help students to understand the links and applicability in different domains and later on, on the labour market. Teacher training provides for the professional development of educators on sustainability concepts. New teaching methods are recommended for enhancing teachers' ability to deliver effective instruction and in order to be able to provide real-world practices as a results of collaboration with industries.

Other recommendations include the provision of free and accessible online courses and resources for individual learning on sustainability subjects. Providing seminars, workshops and conferences that can connect VET learners with industry experts to foster knowledge exchange is deemed essential. There is a need for awareness campaigns to promote sustainability and educate people about sustainability. Increased institutional support to offer sustainability training for educators, resulting in increased knowledge about best practices. In addition, equipped classrooms and laboratories for experiential learning related to sustainability would add value and to be accompanied by lesson plans, methodology for teaching and assessment.

Spain:

1. It is important to be ready for the digital and ecological transformation. Digital and environmental culture should be incorporated in a transversal way in all the degrees of the training program catalog, both initial and occupational, going beyond the incorporation of a training module. The training offer of the sector's vocational training system must be adapted to changes in the configuration of employment such as closer collaboration between the training offer and the real needs of companies, giving rise to collaborative initiatives between the private sector and the education sector, such as the initiative carried out by Naturgy (best practice – see National Report) to incorporate sustainability training transversally in the VET system.
2. There is a need for greater curricular flexibility of the training contents both in initial training and in occupational and continuous training in order to achieve greater adaptation of company workforces. For this reason, the Caixa study (best practice – see National Report) considers that the proposal of the new Organic Law on Vocational Training for curricular modularization could be a good instrument to apply.
3. The criteria for territorial planning of the offer should be revised, since in the Spanish case the training competences are in the Autonomous Communities. Mechanisms should be established to ensure that sufficient qualified personnel can be offered in the localities where they are needed.
4. To give more weight to soft skills, both in vocational and occupational training programs.



5. The approach of the new training law in relation to the modalities of Dual Training opens possibilities to articulate a new role for companies in the qualification of their staff, more oriented to train and specialize the newly hired workforce.
6. From the perspective of environmental sustainability, dual vocational training is a formula for introducing new values, knowledge and skills in companies (and vice versa) on issues related to the circular economy and competencies for environmental sustainability (Cedefop and OECD, 2022; European Commission, Joint Research Centre, 2022). The development of dual training plans that integrate environmental sustainability skills and challenges (energy and resource efficiency, eco-design, etc.) not only stimulates student learning from a green perspective, but can also lead to small, applied innovation projects in the companies that train Dual VET students (Hemkes and Melzig, 2021).
7. Strengthen the presence and collaboration of companies with training centers in order to adapt the training offer to the needs of the companies.
8. Specialized systems are needed to monitor the evolution of the skills and requirements of the productive fabric in these new environmental fields, and to establish equally agile processes for the design of training programs that facilitate the broader participation of students.
9. Educators identified potential in leveraging the large pool of learners undergoing various training, thereby creating a platform to embed sustainability skills and foster impactful personal practices.
10. Collaborations with sustainable companies, consultancies, and NGOs offer a tangible pathway to integrating practical sustainability examples into training programs. Innovative strategies, such as project-based learning and immersive training, were also proposed to propel sustainability competencies forward.



XII. Conclusion

The conclusion summarises the key findings and the importance of sustainable education in VET. It emphasises the role of VET in achieving sustainability goals in Europe.

Ireland:

There is an increasing awareness and discussion about sustainability, however, much of the work is carried out by individuals, lacking a unified approach. Certain types of courses, like apprenticeships, lag in incorporating sustainability compared to traditional class-based learning. Integrating sustainability into existing curricula is challenging.

Italy:

There is an increased demand for a green-skilled workforce by Italian companies, but also an increased mismatch. The consolidation of green jobs entries planned by companies and the increased demand for green skills are positive signs of the growing awareness and interest in environmental sustainability and the green economy among employers, however, almost half of the 4.2 million green job positions opened in 2022 remained vacant, highlighting an increased mismatch between labour supply and demand and a growing need for green-skilled professionals.

There has been significant progress characterised by policy evolutions and inspirational and diverse educational initiatives. There is, however, a need to achieve an effective and consistent integration of GreenComp in the Italian vocational curricula and programs and implement new opportunities to support learners in developing sustainability competences.

Greece:

The Greek educational system has attempted to integrate environmental awareness, however, these attempts were not holistic or targeted in a way that could guarantee the student's knowledge on sustainability or change their attitude, ideas, and way of living. The educators and trainers feel that their training on the subject is insufficient to be able to support the needs of their students. The efforts for implementing sustainability education need to be upscaled and students need to become more equipped with knowledge on sustainability.

Romania

In Romania, there are few national initiatives for sustainability awareness, and these are mainly related to environment protection. In terms of Sustainability Education there is a need for equipped classrooms and laboratories for experiential learning related to sustainability and methodology for teaching and assessment and a need to increase industry commitment and increase their knowledge of the benefits of sustainability competencies in terms of employability.



Spain

There is an emphasis in Spain on the importance of sustainability training and the evolving modalities of Dual Training offer opportunities to align workforce qualifications with new environmental values. While there are established practices and competencies, they are often insufficiently integrated with a lack of institutional support, minimal evaluation, and inadequate teacher training. Strengths lie in instructor involvement and learner interest. Vocational training needs to adapt to changes in the configuration of employment, emphasizing collaboration between the education sector and the private sector to meet industry demands effectively.



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XIV. Appendices

Comparative Summary Report on VET (Vocational Education and Training) Education and Sustainability in Ireland, Spain, Italy, Greece, and Romania.

Q1. How do you perceive the current practices for developing sustainability competencies in VET in Romania?

Ireland	Italy	Romania
<p>Experts have varying opinions on how sustainability competencies are being developed in VET in Ireland. Some believe there is a disjointed approach and suggest integrating sustainability into short-term courses. Only 4 out of 16 respondents recognise the progress being made in the field, but much of this work is carried out by individuals, lacking a unified approach within policy. There is also a disparity in the adoption of sustainability in several types of courses.</p>	<p>Participants rated the current sustainability competencies development practices in VET in Italy on a scale of 1 to 5, with 60% finding them ineffective, 20% considering them neither ineffective nor effective, 13% finding them effective, and 7% highly effective. Reasons for the low ratings included a perceived gap between rhetoric and action, lack of integration into curricula, and resistance to change in educational methods.</p>	<p>Educators perceive current sustainability competencies development practices in VET as insufficient, often theoretical, and not effectively implemented. They can be seen as superficially applied for compliance or to enhance the image of the organisation but not reflected in the teaching activities.</p>

Greece	Spain
<p>Experts perceive a mix of efforts to develop sustainability competencies in VET in their country. Some mention specific programs like "A New Start in VET schools" and the 'Next Generation' EU Green Skills Programme. Efforts are being made to equip learners and</p>	<p>Educators perceive current sustainability competencies in VET as insufficiently implemented and often theoretical rather than practical.</p>



trainers with sustainability knowledge and skills, particularly in the context of the climate crisis and environmental emergency. Training programs on green skills are being promoted for unemployed individuals.	
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The common theme across the educators' responses in all the questions is their concern and interest in the development of sustainability competencies in vocational education and training (VET). It is noted in the responses that it is up to individuals within schools or educational organisations to lead on sustainability practices and that integration into the wider curricula would support the efforts within each country.

Q2. What are the strengths and positive aspects of the existing approaches and practices for sustainability competencies development in VET?

Ireland	Italy	Romania
Strengths in sustainability education in Ireland include growing interest among the educational community and a deeper understanding of sustainability. Experts also see sustainability education as raising awareness of the climate crisis and its importance for the future.	Effective strategies for raising awareness and attention towards sustainability competencies in Italy's VET include awareness-raising initiatives, collaboration with market and non-profit actors, institutional guidelines, integration across subjects, adoption of sustainable practices, institutional policies, and experimental initiatives.	Strengths of existing approaches include the role of instructors, learner and institutional interest, and the initiation of sustainability-focused courses. The rise of digital learning and skills are seen to be more sustainable options for learning and teaching.

Greece	Spain
The strengths of existing approaches include VET's engagement in sustainability competencies development, practical application,	Strengths of existing approaches include the role of instructors, active interest from learners and institutions, and the promotion of student awareness.



access to national and European funds, and the positive impact on students' understanding of environmental issues and practical skills.	
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It is noted that there is a growing interest in sustainable practices within education and VET with the rise of digital learning and awareness of climate action and sustainable policies. It is seen as a positive step towards meeting National targets. It is recognised that the effectiveness of sustainability competencies depends on the dedication and commitment of educators, and this can include time constraints in an already busy work environment.

Q3. What are the weaknesses and limitations of the current practices for sustainability competencies development in VET?

Ireland	Italy	Romania
Weaknesses in sustainability education in VET include a lack of resources, funding, and dedicated training for educators. Accessibility to information and language barriers are also noted. Experts highlight the difficulty in changing existing curricula to incorporate sustainability.	Weaknesses and limitations of current practices in sustainability competencies development in VET include limited training and support for educators, lack of constructive collaboration, absence of clear guidelines, financial and educational resource constraints, difficulties in defining and evaluating competencies, and a lack of recognition and appreciation for educators.	Weaknesses and limitations involve lack of institutional support, job relevance, excessive paper usage, quality concerns, and inadequate teacher training.

Greece	Spain
Weaknesses and limitations include the lack of an established framework,	Weaknesses in current practices include lack of institutional support, limited job



inadequate training for educators, optional nature of actions, insufficient incentives, and the mismatch between training objectives and outcomes. Some also note outdated materials and a lack of expertise among teachers.	relevance, excessive paper usage, and insufficient teacher training.
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Educators' express concerns about the inadequacy of current practices for developing sustainability competencies. They frequently mention that these practices are often theoretical and not effectively implemented in VET programs. It is noted that lack of support from within institutions can create a barrier to implementation of sustainable practices and lack of accessible training opportunities for educators can result in a lack of expertise available.

Q4. What challenges and barriers do VET experts encounter in the implementation of sustainability competencies in VET programs?

Ireland	Italy	Romania
Challenges to implementing sustainability competences include slow development, lack of resources, funding, and awareness. Lack of interest and understanding among staff, students, and the public is also a barrier.	To enhance sustainability competencies development in VET, necessary resources and support include teacher and trainer training programs, collaboration with external partners, competence assessment tools, increased funding, and recognition and incentives for educators.	Challenges in implementation include integration across topics, limited relevant courses, time constraints, resistance to curriculum changes, and the need for educator alignment.

Greece	Spain
Challenges and barriers in implementing sustainability competencies in VET include the shortage of experienced trainers, motivation issues for trainers and	Challenges in implementing sustainability competencies include integration difficulties, limited relevant courses, curriculum constraints, and resistance to change.



trainees, a lack of awareness about the green labour market, insufficient funding, and infrastructure limitations.	
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There are many barriers highlighted to implement GreenComp competences into the curricular framework in institutions, these include a lack of resources and a lack of support at the institutional level which is needed to drive a change in the educational framework. Without these it has been noted that it can lead to a lack of motivation. Resistance to change can occur when the curriculum has been already set and there is no motivation to change it. There is a lack of excellent quality resources available for educators and this can lead to a lack of confidence or unwillingness when implementing new ways of working.

Q5. What opportunities and potential benefits do VET experts identify in developing sustainability competencies in VET?

Ireland	Italy	Romania
Opportunities in sustainability education include learning by example, policy influence, and prospects for a more sustainable workforce.	The perceived level of awareness and commitment of VET actors in Italy towards sustainability competences varies, with 40% rating it as moderate, 20% as high, and 27% as low. There is room for improvement in increasing awareness and dedication among VET educators and policy makers.	Opportunities include impacting society, fostering sustainability-focused economies, aligning with Sustainable Development Goals, and providing cross-cutting training.

Greece	Spain
Opportunities and benefits include improving living conditions, creating new jobs, enabling students to imagine sustainable futures, promoting critical	Opportunities in sustainability competencies development include shaping a greener future, contributing to



thinking, fostering awareness, and meeting the demands of stricter policies like those from the European Commission.	sustainable economies, and aligning with Sustainable Development Goals (SDGs).
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There is clearly referenced benefits in implementing sustainable competences within all learning and these include a contribution to sustainable economies throughout Europe. These include being more aware of sustainability practices, having knowledge of practices to develop a new way of living, having more sustainable practice skills for the workplace and shaping a greener future.

Q6. How do VET experts assess the effectiveness and impact of the current practices for sustainability competencies development in VET?

Ireland	Italy	Romania
Experts lack awareness of formal systems to evaluate the effectiveness of sustainability practices in education. They rely on feedback loops, surveys, and program evaluations, but these methods may not accurately assess sustainable competences.	Collaboration and partnership opportunities to enhance sustainability competencies development in VET involve the private sector, civil society, international partnerships for knowledge exchange, and research and academic collaborations.	Current practices lack thorough evaluation, and their effectiveness and impact are not systematically assessed.

Greece	Spain
VET experts view the current impact of sustainability competencies development as small and believe that efforts should continue and expand to reach a wider audience.	Educators perceive a lack of evaluation and assessment of the effectiveness and impact of current practices for sustainability competencies development.



Current systems in place lack the structure and frameworks for evaluation and monitoring of sustainable competences within learning. There is limited understanding of the effectiveness when implementing sustainable competences within curriculum. More robust monitoring and evaluation tools are needed to measure the impact on the institutions, educators, learners, and society to foster support and commitment from outside agencies and organisations.

Q7. What resources, support, and infrastructure are necessary to enhance the development of sustainability competencies in VET?

Ireland	Italy	Romania
<p>Resources, support, and infrastructure is essential for enhancing sustainability competences.</p> <p>Respondents emphasise staff and tutor training as a top priority, followed by funding.</p>	<p>Collaboration and partnership opportunities to enhance sustainability competencies development in VET involve the private sector, civil society, international partnerships for knowledge exchange, and research and academic collaborations.</p>	<p>Educators perceive a lack of dedicated resources, support, and infrastructure to enhance sustainability competencies in VET.</p>

Greece	Spain
<p>Necessary resources, support, and infrastructure include trained educators and trainers, funding from EU and national sources, updated curriculum with a focus on sustainable development, and practical instructions for teachers.</p>	<p>Resources, support, and infrastructure for sustainability competencies development are perceived as lacking in VET.</p>

It is necessary to have dedicated resources readily available for all educators to integrate sustainability practices into all teaching and learning. Staff and tutor training is key to legitimately implement GreenComp sustainability competences into the core curriculum.



Q8. How do VET experts perceive the level of awareness and commitment among VET stakeholders towards sustainability competencies?

Ireland	Italy	Romania
Experts believe awareness of sustainability is growing, but there is no system for gauging awareness. Some interviewees see a complete lack of awareness and commitment among education stakeholders.	The future of sustainability competencies in VET in Italy involves collaboration with the private sector, educator readiness, experiential learning, and the integration of sustainability competencies into curricula. Partnership-driven approaches, teacher preparation, practical engagement, and curriculum cohesion are key aspects.	There is a perception of low awareness and commitment among VET stakeholders towards sustainability competencies.

Greece	Spain
The level of awareness and commitment among VET stakeholders towards sustainability competencies varies, with some expressing satisfaction but recognising the need for more awareness-raising efforts.	There is a low level of awareness and commitment among VET stakeholders towards sustainability competencies.

There is a low level of awareness surrounding the GreenComp framework and although there is some awareness at a theoretical level, there is limited knowledge at operational level. Recently more institutions are taking a more proactive approach to implement sustainability practices, however, they are often overshadowed by economic and academic outputs instead.



Q9. What innovative approaches or strategies do VET experts suggest for further advancing the development of sustainability competencies in VET?

Ireland	Italy	Romania
<p>Innovative approaches include integrating sustainability into short-term qualifications, promoting collaboration, and increasing training for educators.</p>	<p>To make the future of sustainability competences in VET a reality in Italy, participants emphasise the need for financial investments, recognition of educators, transitioning from words to action, curricular integration, forward-thinking leadership, enhanced educator preparation and resources, awareness, practical initiatives, collaborative networks, and institutional support and frameworks.</p>	<p>Innovative approaches suggested included; comprehensive training plans, practical sustainability measures, projects, and service-learning experiences. There needs to be an emphasis on the importance of training for teachers, offering practical methodologies that incorporate real-world scenarios.</p>

Greece	Spain
<p>Suggested innovative approaches for advancing sustainability competencies include experiential teaching, workshops, practical exercises, specialised digital courses, case studies, field research, and continuous updates of educational materials.</p>	<p>Suggested innovative approaches should include; comprehensive training plans, practical measures in the learning environment, projects, and immersive training.</p>

Immersive teacher training and pupil learning, development of practical methodologies and project-based learning are all ways that can further advance the development of sustainability competencies in VET. It has also been suggested that taking practical actions on site can support confidence and instil a norm like behaviour within the institution. Involving learners in sustainability challenges and leading by doing such as



changing to more energy efficient heating and lights and increasing recycling can promote the changes from the top level in the institution.

Q10. What collaboration and partnership opportunities exist or should be fostered to enhance the development of sustainability competencies in VET?

Ireland	Romania
Collaboration and partnership opportunities include working with other educational institutions, the EU, policy makers, local businesses and industry to enhance sustainability competences.	Collaboration opportunities involve partnerships with sustainable companies, consultancies, NGOs and certification bodies. There is a need for the engagement to be multi-level within organisations and public administration.

Greece	Spain
Collaboration and partnership opportunities involve universities, professionals specialising in sustainability, and local communities. There is a need to create networks and promote cooperation between institutions and the private and public sectors.	Collaboration opportunities involve partnerships with sustainable companies, consultancies, NGOs and public administrations to enhance sustainability competencies. Being able to leverage good practice examples would enable VET teachers to access more resources. Having a multi-level approach to cooperation is key to fostering and maintaining partnerships.

There have been many organisations identified as potential collaborators, such as industry partners, NGO's, public agencies, government bodies and other education networks. VET institutions to be successful cannot work in silo and must interact with partners in local and nations organisations, as there can be cross academic benefits, job opportunities, a chance to deliver and inform policy changes and to build relations with external organisations.

Q11. How do VET experts envision the future of sustainability competencies in VET, considering the evolving needs and trends in sustainable development?



Ireland	Romania
<p>The future of sustainability competences in education is expected to grow and evolve. Experts envision continued renewal of policy and curricula, emphasising communication, and potential integration across all levels of education.</p>	<p>Educators envision a progressive implementation of sustainability competencies in VET to address evolving needs and trends towards a more sustainable society.</p>

Greece	Spain
<p>VET experts envision a positive future for sustainability competencies in VET, with increased career opportunities, integration of sustainability values, and the importance of sustainability skills in a changing job market. Continuous education and training are seen as crucial for adaptation to evolving needs in sustainable development.</p>	<p>The future of sustainability competencies in VET is seen as progressively important, driven by societal needs and evolving trends in sustainable development, despite some pessimistic views.</p>

It is seen as imperative to align education with the Sustainable Development Goals through the curriculum, to create a societal awareness of sustainable practices in everyday living and see these global goals as guiding objectives for VET programs. Educators stress that sustainability competencies are essential for both personal and societal well-being and see these skills as contributing to individual growth and addressing global challenges.