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GreenHive

# GreenHive

# Methodological Framework

TUS KEAN lascò femxa TEAM 4 excellence

# Contents



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# 1. Introduction

## 1.1 Introduction

The role of education in shaping active citizens who can put the goals of Sustainable Development into practice is very important. Sustainable development prioritises the quality of human life by ensuring the improvement of three fundamental issues the economy, society and the environment. For this to be achieved, it is necessary to shift the way of thinking and acting of citizens who should not only acquire knowledge on environmental protection and sustainable development, but also actively show their involvement in solving these issues. This will be achieved through cooperation at local, national and international level, by being respectful, caring, developing skills such as critical thinking, problem solving but also having ethical values, building awareness, environmental responsibility, good behaviour and attitudes, values and norms.

Education should bring young people into contact with local community stakeholders and with the problems they face daily, furthermore should inform all citizens, young and old, through coordinated efforts to educate the local community. Thus, the Sustainable School, although one could say that constitutes a utopian school, integrates sustainability in every stage and aspect of its operation, is democratic, follows educational practices and innovations in its actions and curricula, resulting in the formation and production of new perceptions in young citizens in order to support a moral and sustainable society, aiming at the needs of human welfare and safeguarding the environment.

## 1.2 The Project

Green Hive 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, such as the Technological University of the Shannon: Midlands Midwest (Ireland), the companies Lascò (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".

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:

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- 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.

## 1.3 The Consortium

Femxa Formación S.L.U is a company specialized in consulting and training for employment, addressed to companies, public administrations, professional offices, training centres, and individuals. Its goal is to increase organizations' competitiveness and people's employability and professional qualification.
Since 1999, Femxa has been developing and implementing training plans for diverse business sectors in Spain and Latin America, providing tailored training solutions, conferences, coaching sessions and workshops. The company has:
- designed and implemented over 1.300 training projects, training more than 550.000 students.
- delivered more than 400 face-to-face and e-learning projects, training workers from all over Spain, as well as staff from corporations and universities in Mexico, Peru, Colombia, and Romania.
- carried out consulting, virtualization, and e-learning platform services for large institutional and corporate clients, such as Inditex, Walmart, Bosch, Bayer, Nestle, Easter, BorgWarner, etc.

Founded in 2004, KEAN is a nonprofit organization, developing and implementing humanitarian programs to protect the social and physical environment. The organization has wide experience and expertise in implementing projects aimed at promoting employability and entrepreneurship. It offers young people and adults a wide range of opportunities to participate in EU programs (Erasmus+, DAPHNE, REC, HorizonEurope, EuropeAid), vocational training

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opportunities and volunteering. Furthermore, KEAN developed the "Planetbook Game", the first educational board and floor game about the environment and climate changes, successfully delivered in three continents.

TUS Midlands and Midwest (Ireland) a multi-campus university containing over 14,000 students spread across six campuses throughout Ireland's Midwest and Midlands regions.
Its vision is to deliver excellence in multidisciplinary research practice and encourage collaboration between researchers and strategic European and global partners in industry and academia. The aim is to advance the key research priorities relevant to the region, aligned with national and European research priorities, and the United Nations' Sustainable Development Goals (SDGs). TUS has a world-leading research infrastructure that inspires and enables transformative research, development and innovation. We empower students by providing an outstanding higher education experience relevant and responsive to our stakeholders' needs. The hallmark of the educational philosophy is active learning through a fusion of theory and practice.

TEAM4Excellence (T4E) is a non-governmental organisation founded in 2017 in Constanta (RO). It praises mobility, voluntarism, diversity, equality, tolerance, involvement, participation, engagement and empowerment and helps people to gain additional knowledge, attitudes, transversal competencies.
The organisation actively designs and executes projects for implementing the UN Sustainable Development Goals in private and public institutions, developing actions aimed at increasing awareness and competencies at the individual level and improving capabilities of organisations to adopt relevant goals, to set targets, to design, implement and refine processes. For this purpose, the organisation engages internationally in knowledge transfer and use the EFQM network to streamline good practices towards Erasmus+ and the local community. Moreover, since 2019, T4E has contributed to the design and implementation of numerous international mobilities for young people and youth workers in the field of environment and the fight against climate change.

Lascò is an innovative SME, founded in 2013 to guide people and organisations in pathways towards innovation and digital transformation. The company is specialized in digital products, including e-learning platforms and LMS, complex ERPs and management software for corporates, apps, eCommerce and marketplaces, platforms based on Blockchain technology, Marketing Automation and Data Analysis systems, as well as methodologies and tools to carry out innovation projects within corporates, Adult, Vocational and Higher Education entities.

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Together with its national and international partners, Lascò designs and implements training experiences to foster digital skills, innovation management competences and entrepreneurship among young people, adults, and corporates. The company regularly runs workshops with the Startup Grind community, supported by Microsoft for Startups, to inspire and connect innovators, holds coaching and mentorship activities for professionals and innovative teams, and design workshops to think, work and design through Lean, Design Thinking and Agile methodologies and frameworks.

## 1.4 Background and rationale

Key priority of the GreenHive project is to contribute to innovation in developing green skills in Vocational Education and Training. Innovation is about the creation of something that is both new and a value but also about its adoption and its implementation, so as to address the evolving needs of the workforce and society. The key aspects of innovation are creativity and change. Innovation, however, is more than just creativity. It encompasses the entire process of taking a creative idea and turning it into something valuable and practical. It also includes the process of overcoming resistance in change to lead to the adoption and usage within society, so us to enable real change to the world around us. System innovation refers to using systems thinking to enable transformative change within complex organizations.
The project seeks to contribute to system innovation in European VET, introducing and piloting a more holistic and network-based approach, as well as a new value model to align multiple and relevant stakeholders across the system: the Green Hive model will connect VET providers, learners and local communities across countries, enabling knowledge exchanges at the local and transnational level, anticipating skills needs and, ultimately, empowering individuals and organisations to cooperate to innovate and co-create value.
The project aims to introduce substantial changes in VET practices, particularly in the VET ecosystem-building practices and teaching and learning processes. The consortium produced the present methodological framework and tools to build a European ecosystem ("Green Hive") of localized hubs for sustainability education ("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 organizations and professional associations) for learning, networking and cooperating on sustainability challenges. Hence, the project's main results will innovate how VET providers engage with partners and external actors through networking and internationalization systems. The project promotes the establishment of permanent VET co-creation structures where students will be enabled to think in systems, understand the interconnectedness of economy, society and the environment, and ultimately develop their systemic and critical thinking competencies by collaborating with other students and external stakeholders.
Thus, the innovative dimension of the project is related to the introduction of the aforementioned system innovation model in VET, to the content of its outputs (new in

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the VET field), to the introduction of new products to meet the growing need for green skills and sustainability competences.

## 1.5 Nature of Methodological framework

The present Methodological Framework for Vocational Education Trainers (VET) and sustainability education focuses on enhancing VET providers' careers while promoting sustainable practices that consider environmental, social, and economic well-being. This framework aims to equip learners with the skills and knowledge needed to contribute to sustainable development in their chosen field and to create connections between VET institutions.

Methodology plays a crucial role in this framework, as it provides a structured approach and a set of guidelines for establishing the desired connections between VET professionals and thus for creating effective and reliable local hubs in sustainability education. Methodology also helps in defining the objectives and scope of the framework. It assists in identifying the challenge that the framework intends to address and ensures that the framework's purpose is clear and well-defined. Moreover, it outlines the development process for creating the localized Hubs including the tools, technologies, and best practices to be used. It provides a structured and systematic approach to framework development, ensuring that the framework is well-planned, well-designed, well-documented, and capable of meeting its intended objectives. It helps the project consortium and stakeholders navigate the complex process of framework implementation, leading to more effective and reliable solutions in promoting sustainability education.

More specifically, the current Methodological Framework is going to provide the guidelines for developing a European sustainability education ecosystem ("Green Hive") for VET providers, based on system innovation principles. The Green Hive will be a European platform-based network of localized Sustainability Education Hubs ("Green Combs"), establishing connections within and between VET institutions in the EU and Partner countries. The platform will connect the Hubs through the Internet, in order to facilitate the transfer of local experience, knowledge and innovation in the field of the implementation of the EU sustainability competence framework (GreenComp) and encourage collective actions of VET providers and learners to co-create solutions for sustainability, pursuant of the UN SDG no. 13.

Nevertheless, the scope of the present framework is not to provide just a set of guidelines and a development process for creating the Hubs (Green Combs), but also to address the needs of the VET providers and professionals, while creating these Hubs. That's why the aim of the "Green Hive: Methodological Framework" is not to be prescriptive but to offer possibilities and options. Besides describing the general functions of the ecosystem and its components, it also includes the requirements, structure, opportunities and key capacities of the ecosystem. It clarifies the roles within the ecosystem and the connectors between the central platform and the localized hubs, but also describes the development principles and functions of the local hubs. Finally, it defines the ecosystem and hubs' activities areas to develop teachers, trainers and learners' sustainability competences.

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## 1.6 Development process

The Methodological Framework for creating a European sustainability education ecosystem ("Green Hive") for VET providers, based on system innovation principles, was developed following five main phases:

1. Data collection and analysis
2. Pattern identification and analysis
3. Categorisation of the target groups
4. Analysis of the target groups' needs
5. Development
6. Validation

**Phase 1. Data collection and analysis**

The first stage of the data gathering and analysis process was implemented in the Green Hive project design phase: exploratory research was carried out by the project partners to map and select data sources to support the high-level definition of the Framework. The research involved the revision by project's partners of national educational guidelines in each country( Italy, Greece, Romania, Spain, Ireland), policy documents, curricula, syllabi, and research studies, to explore which are the current practices and policies for developing GreenComp sustainability competencies in VET in each country, how national educational guidelines address integrating sustainability competencies in VET curricula and what government policies and initiatives are in place to promote the development of sustainability competencies in VET. In the scope of the research, at least 10 best practices in developing sustainability competencies in education and training institutions were identified and analysed in each country. At least 50 best practices in total are going to be included in the digital database of the project.

In the second stage, semi-structured interviews were conducted with VET experts in each country to gather their perspectives on sustainability education in the national VET system. A semi-structured questionnaire was used as an interview guide for the researcher. Certain predetermined questions were prepared to guide the interviews and ensure that the research objectives were addressed.

**Phase 2. Pattern identification and analysis**

The project team researched and analyzed patterns related to green skills, sustainability competences, and Vocational Education and Training (VET). The goal was to identify best practices, analyze patterns in their implementation, consider the type of institution involved, identify deviations from patterns, and determine factors explaining these deviations. Finally, the objective was to identify elements to embed in a framework.

**Phase 3. Categorisation of the target groups**

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An analysis of the national Vocational Education and Training (VET) systems in the countries involved was conducted. The purpose of this analysis was to identify a common categorization or classification of groups of expert swho would be the focus of the Framework's implementation.

**Phase 4. Analysis of the target groups' needs**
The analysis of the characteristics, needs, and challenges of the various target groups was based on experiential inputs and needs gathered through interviews. These interviews were conducted as part of transnational research involving at least 15 VET providers per country, as well as at least 20 additional semi-structured interviews with experts in each partner country.

**Phase 5. Development**
Lascò, supported by the partners' experts, reassessed the patterns of implementing sustainability competences, identified in the best practices that were collected, concerning the target groups' needs to develop the conceptual structure (Methodological Framework) that will provide the guidelines to build a European platform-based ecosystem (Green Hive) for VET providers, but also to create local multi-stakeholder hubs for sustainability education.
**Phase 6. Validation**
The Framework was validated through a survey addressed to VET teachers and trainers from the five participating countries. A significant number of experts were involved in evaluating the following characteristics of the Framework:

- Clarity
- Logic
- Effectiveness
- Suitability for the target groups
- comprehensives

## 1.6.1 Analysis of target groups needs

### Greece

Chart of the national education and training system in Greece

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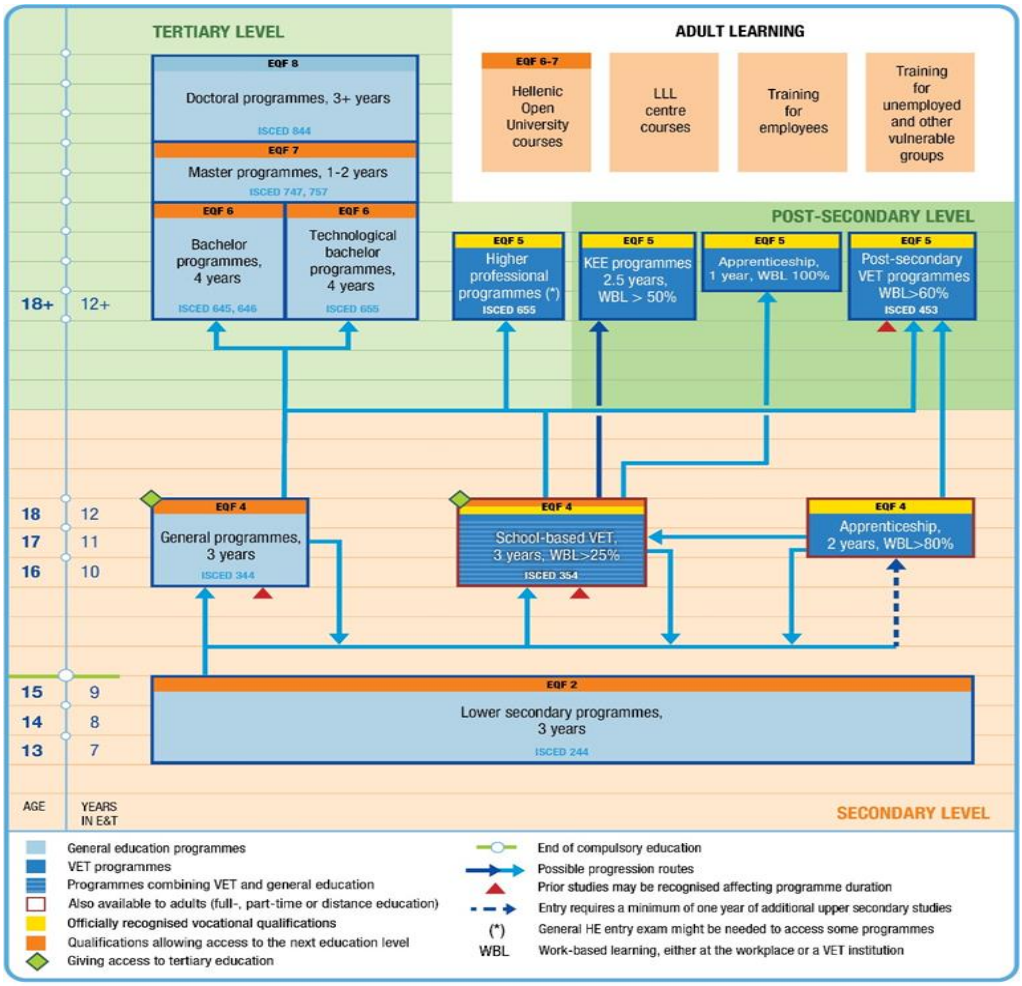


NB: ISCED-P 2011.

*Source:* Cedefop and ReferNet Greece, 2020.

Vocational education and training (VET) in Greece are strongly regulated by the state and primarily offered through a school-based approach. The Ministry of Education, Religious Affairs and Sports plays a significant role in overseeing and managing the national VET system. Additionally, the Ministry of Labour and Social Affairs cooperates with the Ministry of Education in managing and implementing various aspects of vocational training and education.

Providers of Vocational Education and Training

- Upper secondary vocational education

Upper secondary vocational education programs are considered part of "formal VET" in the national context. In the context of vocational education and training, "formal VET" typically refers to programs that are officially recognized by public authorities and lead to the acquisition of certificates that hold national recognition. These certificates are often an essential part of the education ladder and can provide individuals with the necessary qualifications and skills for various careers. Formal education in Greece includes options for adults, such as evening EPAL (vocational) schools.

Regarding upper secondary VET (Law 4386/2016), students have the following options in addition to the general upper secondary school:

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1. Initial vocational education within the formal education system in the second cycle of secondary education at a vocational upper secondary school (EPAL, day or evening school). According to the law on secondary education (Law 4186/2013) and its amendments, upper secondary vocational education programmes are provided by the vocational upper secondary schools. These schools (public or private) are founded exclusively by the Ministry of Education and may be day or evening schools. The minimum age for enrolling in a vocational evening school is 15.
2. Initial vocational education at an apprenticeship school (EPAS) at the upper secondary level. The function of EPAS schools is supervised by DYPA (the Greek Public Employment Service).
3. Initial vocational training (outside the formal education system, referred to as non-formal) in post-secondary vocational training institutes (IEK), centres for lifelong learning and colleges, and also the postsecondary apprenticeship year (or apprenticeship class) for EPAL graduates.

- Continuous VET – LLLCs (Vocational Training Centres – Informal VET)

In Greece, continuous vocational training and general adult education are primarily provided through lifelong learning centers (LLCs). The Ministry of Education, with the assistance of EOPPEP (National Organization for the Certification of Qualifications & Vocational Guidance), is responsible for overseeing the quality of non-formal education, evaluating the performance of these lifelong learning centers, and monitoring their operations.
Vocational education and training programs are also offered by universities in Greece, including the Hellenic Open University. These programs cover a wide range of subjects, including ICT, tourism studies, accounting, economics, administration, energy and environment, food safety, production management, and even programs designed for international students and repatriated Greeks.
Moreover, almost all the ministries and their supervisory bodies implement continuing vocational training programmes for their staff or broader groups (distance learning for Greek language teachers, cross-cultural communication, youth entrepreneurship, job-seeker training courses in green occupations, training for mediators, and health professionals, judges, etc.).
Currently, qualifications that are acquired through continuing vocational training are not correlated to levels of the national qualifications framework.
Ministries and their supervisory bodies are actively involved in providing continuing vocational training to their staff and broader target groups. These programs cover a wide array of subjects and are tailored to meet the specific needs and requirements of different professions and sectors, such as Greek language teaching, cross-cultural communication, entrepreneurship, green occupations, mediation, healthcare, and legal professions.

Formal, non-formal, initial and continuing VET

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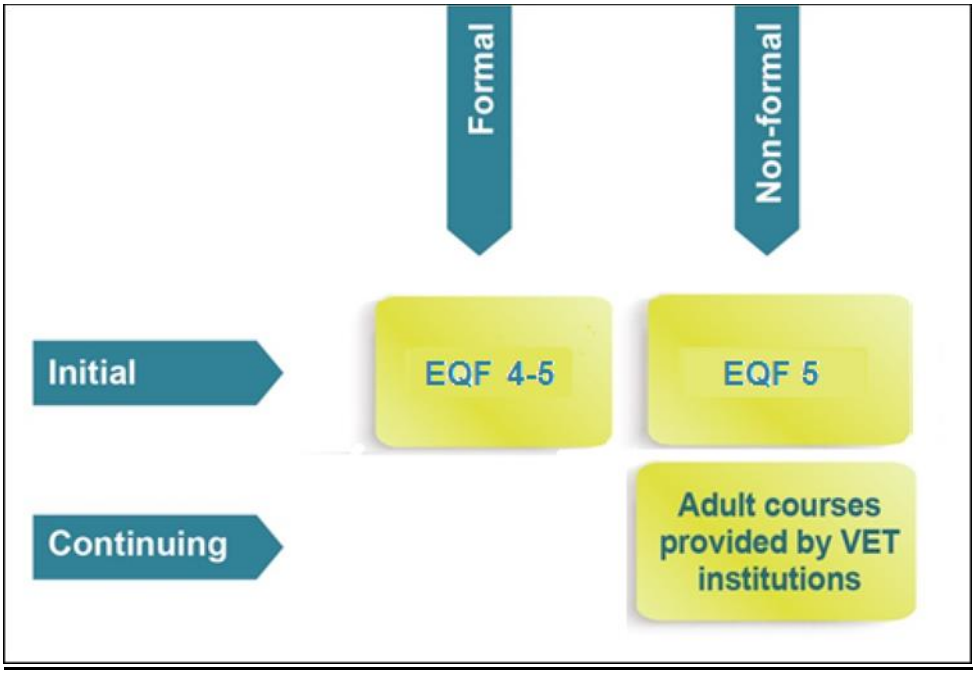


Source: https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/greece-2019

Both formal and non-formal learning provide the knowledge, skills and attitudes necessary to enter the labour market. Only initial VET is linked to professional rights (licenses). Some initial VET programs give learners access to the next qualification level (post-secondary or tertiary level). Non-formal continuing VET is part of adult learning. It is partially recognised in the private sector of the labour market.
In the context of the National Qualifications Framework (NQF) and the European Qualifications Framework (EQF), formal VET typically leads to qualification level 4, while non-formal VET leads to qualification level 5. It's important to note that there is an exception for the "Security Staff" certification in non-formal continuing VET, which is at NQF level 3 as specified by law 4229/2014. VET standards are in place to specify the volume, learning outcomes, conditions for completion, and the continuation of studies for each type of VET. These standards provide a clear framework for the content and structure of vocational education and training programs.
There are several VET learning options:

1. school-based learning.
2. work practice (including internships and apprenticeships).
3. self-learning (too partial).

The title of VET programs is awarded to learners after they successfully complete state examinations. These examinations serve as a formal certification of the qualifications acquired through their vocational education and training. The education ministry or the National Organisation for the Certification of Qualifications and Vocational Guidance (EOPPEP) or the labour ministry are responsible for the certification procedure.

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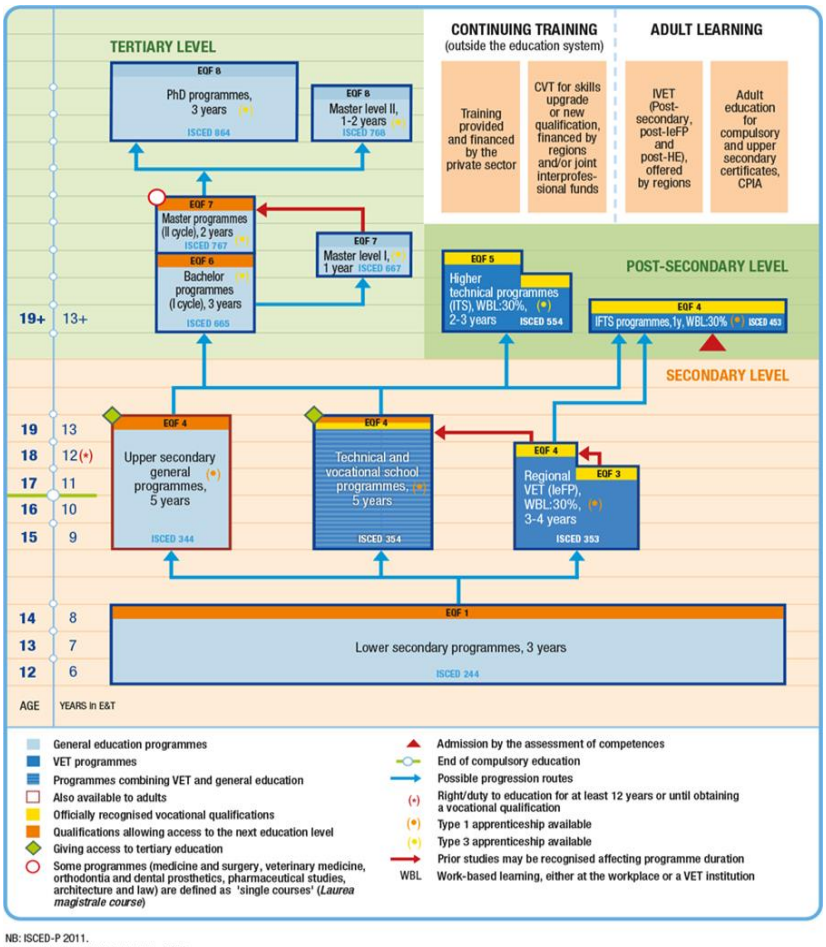
## Italy

Chart of the national education and training system in Italy

Compulsory education lasts for 10 years, typically until the age of 16. However, at age 14, learners are given the choice between pursuing general education and Vocational Education and Training (VET). Learners are granted the "right/duty" (diritto/dovere) to continue their education until the age of 18, allowing them to achieve a total of 12 years of education and/or vocational qualifications.
VET in Italy comprises the following main features:

1. education and employment ministries lay down the rules and general principles, but the regions and autonomous provinces oversee VET programs and apprenticeship-type schemes.
2. there are three types of apprenticeship with one type (Type 2) not corresponding to any education level but leading only to occupational qualifications recognised by the labour market.
3. continuing VET is mainly directed towards employed people.
4. in January 2018 Italy adopted the national qualifications framework which is very important for the re-designing of qualifications.

Providers of Vocational Education and Training




NB: ISCED-P 2011.
*Source:* Cedefop and ReferNet Italy, 2019.

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- Upper secondary vocational education

All upper secondary education programs are school-based but could also be delivered as apprenticeships (type 1).
Technical school programs (istituti tecnici) are designed to equip learners with knowledge, skills, and competences to perform technical and administrative tasks. These programs start at the age of 14 and conclude at age 19. They offer an upper secondary education diploma at EQF level 4. Example specializations include tourism, graphics and communication, administration, finance, and marketing.
In vocational school programs (istituti professionali), learners in these programs acquire specific theoretical and practical preparation to carry out qualified tasks in production fields of national interest. These programs also start at the age of 14 and finish at 19. They provide learners with an upper secondary education diploma.
VET for adults is provided by various public and private providers. It encompasses programs leading to upper secondary VET qualifications, especially aiming to provide progression opportunities for low-skilled individuals. Provincial Adult Education Centres (CPIA - Centri Provinciali per l'Istruzione degli Adulti) under the jurisdiction of the education ministry offer these programs.

- Post-secondary VET

The post-secondary education and training system consists of two different training types: Higher Technical Education and Training (IFTS) and Higher Technical Education (ITS). They are two distinct pathways within the Italian education system, each with its unique characteristics.
Higher Technical Education and Training (IFTS) are higher technical training programs, designed to provide practical and job-oriented skills to students. IFTS programs can be offered by various types of educational institutions and organizations, including schools, universities, accredited training institutions, and even companies. These entities can come together to form Temporary Associations of Companies (ATI) or Temporary Purpose Associations (ATS) to offer IFTS programs.

- Continuing Vocational Education and Training (CVET)

Continuing Vocational Education and Training (CVET) primarily caters to the needs of the employed workforce. It is a comprehensive system of training initiatives supported by legislative measures and various tools. The management and coordination of CVET are overseen by several key entities, including the labor ministry, economic development ministry, regions, autonomous provinces, and social partners.

## Romania

Chart of the national education and training system in Romania

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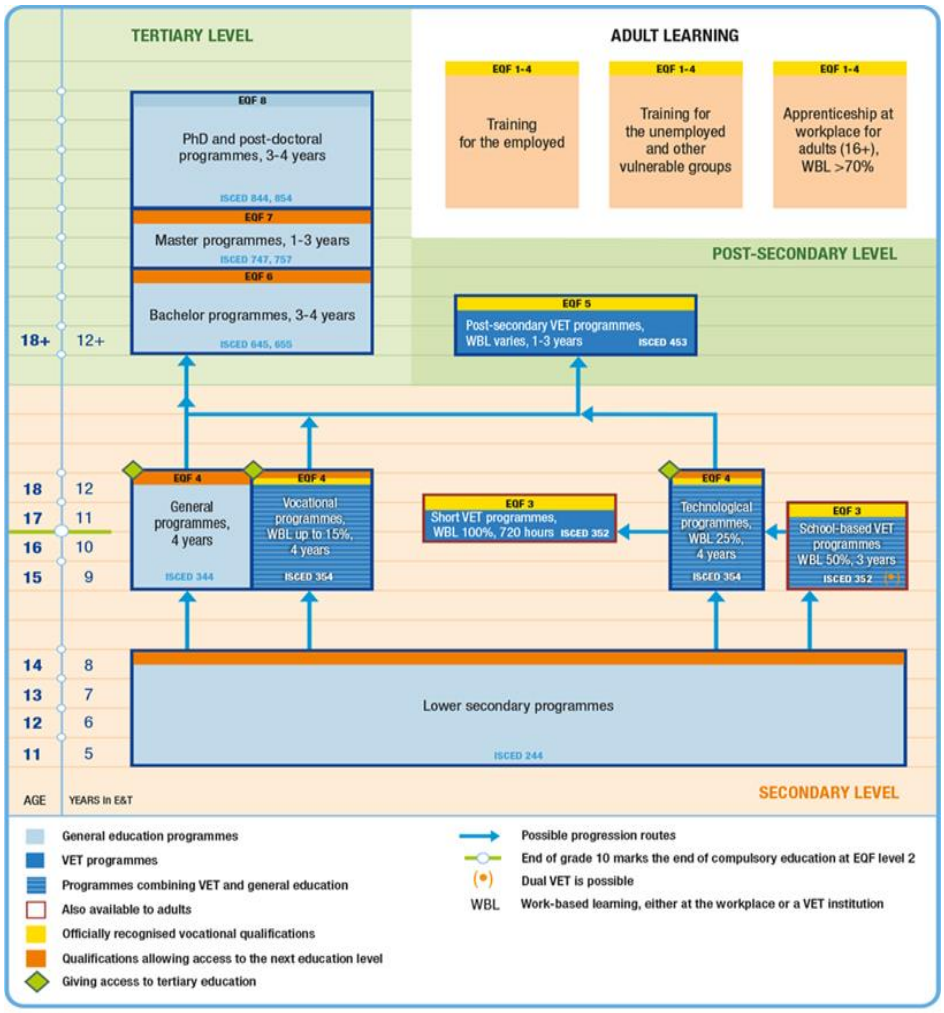
Providers of Vocational Education and Training

- Initial VET

Initial VET is provided at upper secondary and post-secondary levels. Learners have the option to enroll in upper secondary VET at the age of 15, typically in grade 9. Students who complete upper secondary VET programs can acquire qualifications and certifications specific to the 'school-based VET' chosen pathway.

At the upper secondary level, there are four types of VET programs:

1. three-year professional programs (ISCED-P 352, învățământ professional),
2. called 'school-based VET' provide graduates with a professional qualification of 'skilled worker' at EQF level 3 (i.e., cook, baker, carpenter). It is provided by 'professional schools' that cooperate with employers who provide compulsory in-company training.
3. four-year technological programs (ISCED-P 354, liceu tehnologic) offer graduates an upper secondary school-leaving diploma and the EQF level 4 'technician' qualification. These programs cover a wide range of study fields, including services, natural resources, environmental protection, and technical areas




NB: ISCED-P 2011.
*Source:* Cedefop and ReferNet Romania, 2019.

(e.g., technician in gastronomy, industrial design technician).

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4. short VET programs (ISCED-P 352 stagii de practica) are typically designed for learners who have completed two years of a technological program (equivalent to completing grade 10). These programs provide learners with a professional qualification, allowing them to acquire specific skills in a shorter timeframe.
5. four-year vocational programs (ISCED-P 354, EQF level 4, liceu vocational) provide graduates with a professional qualification in military, theology, sports, arts and pedagogy as well as with an upper secondary school-leaving diploma.

Initial VET providers are:

1. technological high schools/colleges (licee tehnologice/ colegii tehnice), which provide four-year technological programs leading to EQF level 4 or three-year professional programs; all high schools fulfilling criteria set by the education ministry may apply for a 'college' title, which is recognition of the quality of their education and training programs:
2. professional schools, which provide three-year professional programs.
3. (vocational) military, theology, sports, arts and pedagogy high schools/ colleges, which provide vocational programs.
4. post-secondary high schools (or 'post-high schools'), which provide post-secondary VET programs; these are often independent departments under technical colleges or universities.

- Continuing VET

Continuing VET (also known as adult vocational training) is available for learners from age 16. It is designed to cater to the needs of individuals who are already in the workforce or have completed their initial education but wish to further develop their skills and knowledge.

Adult training courses are offered by authorised training providers or by employers to adults willing to obtain a qualification, specialisation or key competences:

1. authorised courses for the unemployed, employees, people who resume work after maternity leave or long sickness leave, Roma, groups at risk and other groups.
2. courses organised by employers for their staff without issuing nationally recognised certificates.
3. internship and specialisation, including periods of learning abroad.
4. all other forms of training.

The National Agency for Employment offers continuing VET programs, based on analysis of vacancy and jobseeker data and formulated in the annual national plan for vocational training.

Adult vocational training providers are authorised, in line with Government Ordinance No 129/2000, to carry out vocational training based on occupational/vocational training standards after authorisation by the county commission.

## Spain

Chart of the national education and training system in Spain

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Providers of Vocational Education and Training

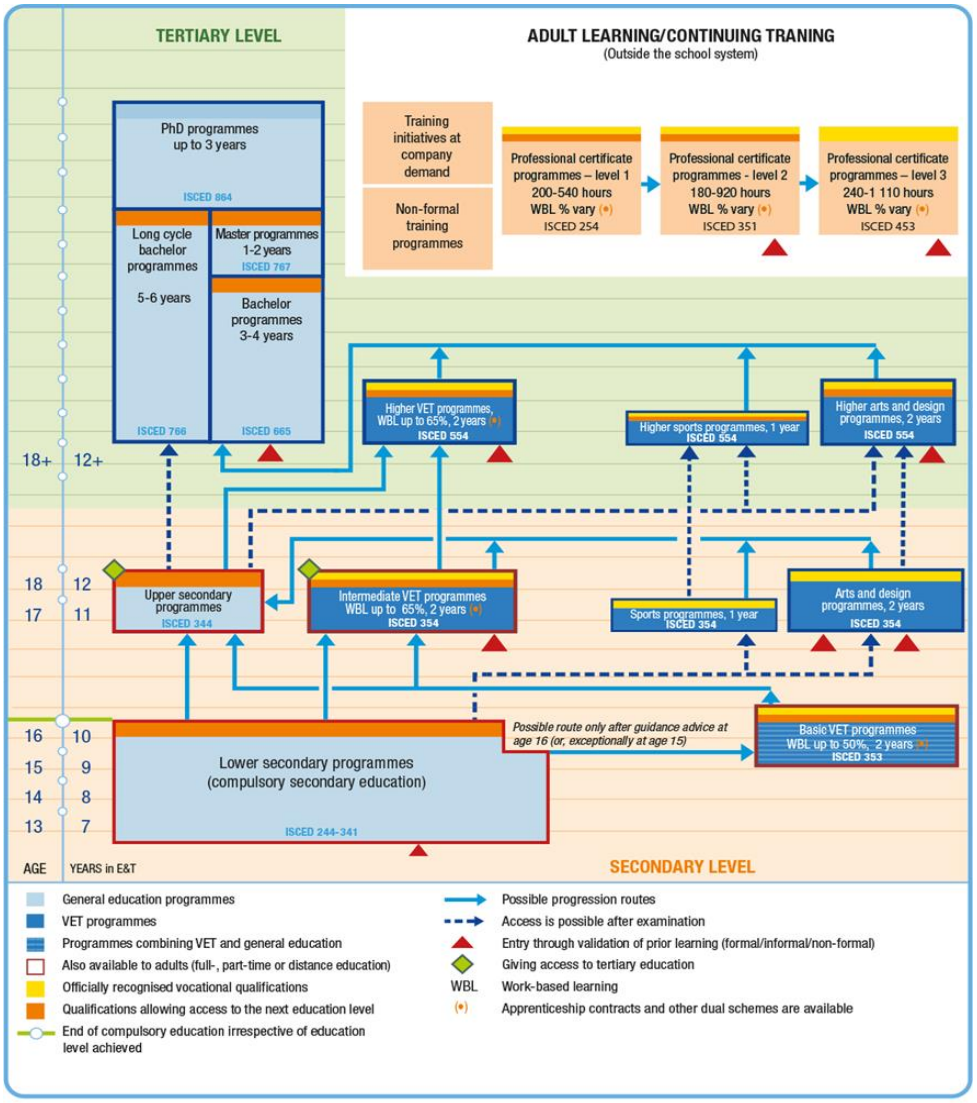
Main education authority providing VET in Spain include:

1. public, publicly funded private and private institutions approved by the competent education authority.
2. in some cases, integrated training centres which are public and provide both initial vocational training within the education system, and vocational training for employment.

Public, publicly funded private and private centres are the main providers of VET programs (only one in four learners attends private centres).

- Basic VET and Upper Secondary VET

Basic VET (or FP Básica in Spanish) is open to Lower secondary education (known as ESO in Spanish) students aged 15 years, who meet certain age and academic requirements. Students passing this basic VET program are awarded a diploma with academic and professional validity (Título profesional básico). Basic VET cycles run in




NB: ISCED-P 2011. The Spanish education system is not referenced to EQF levels.

*Source:* Cedefop and ReferNet Spain.

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a 2-year program of 2.000 hours of theoretical and practical training, of which a minimum of 240 hours are completed in workplaces. It gives direct access to intermediate VET cycles and the possibility of sitting the exam to obtain the ESO diploma, opening up access to upper secondary general education programs. Students who finish basic VET will obtain the ESO diploma directly if the teaching staff considers they have achieved the objectives and necessary skills of ESO level. Upper secondary education comprises high school (the general academic route, bachillerato in Spanish) and intermediate VET, neither of which is compulsory.
The Spanish initial vocational education and training system, IVET, is organised at basic (lower secondary ISCED 353), intermediate (upper secondary ISCED 354) and higher (tertiary ISCED 554) levels.

- Adult education

Adult education is a vital component of educational systems, aiming to cater to individuals aged 18 and older (in some cases, over 16) by providing opportunities to enhance personal and professional development. To achieve this goal, the education authorities collaborate with other public authorities responsible for adult learning and particularly with the labour authorities, as well as with local government and social partners (employers and trade union organisations; as well as chambers of commerce in dual VET). Education authorities provide basic education for adults who for different reasons do not hold the end of compulsory education qualification (título ESO). It comprises primary education, lower secondary education, vocational training, and language education (non-formal education and training programs). Post-compulsory studies (Bachillerato and vocational training for adults) are also provided. Programs for adults may be offered on a full time, part-time or modular basis.

- Continuing VET

Vocational training for employment falls mainly under the remit of the labour ministry. It includes training programs for both employed and unemployed workers, with the aim of improving the employability of the population through professional training or retraining. It also provides an opportunity for people who left education with low or no qualifications to improve their competences and skills or level of qualification.
There are two main types of VET programs that target people who do not hold any qualification (partial or full) or who need to upskill their qualifications so as to improve their employability:

1. programs linked to the national catalogue of occupational standards (CNCP) which provide training to obtain a professional certificate (Certificados de Profesionalidad in Spanish - CdP);
2. programs not linked to the National Catalogue of Occupational Standards, some of which are included in the Catalogue of Training Specialities of the state public employment service.

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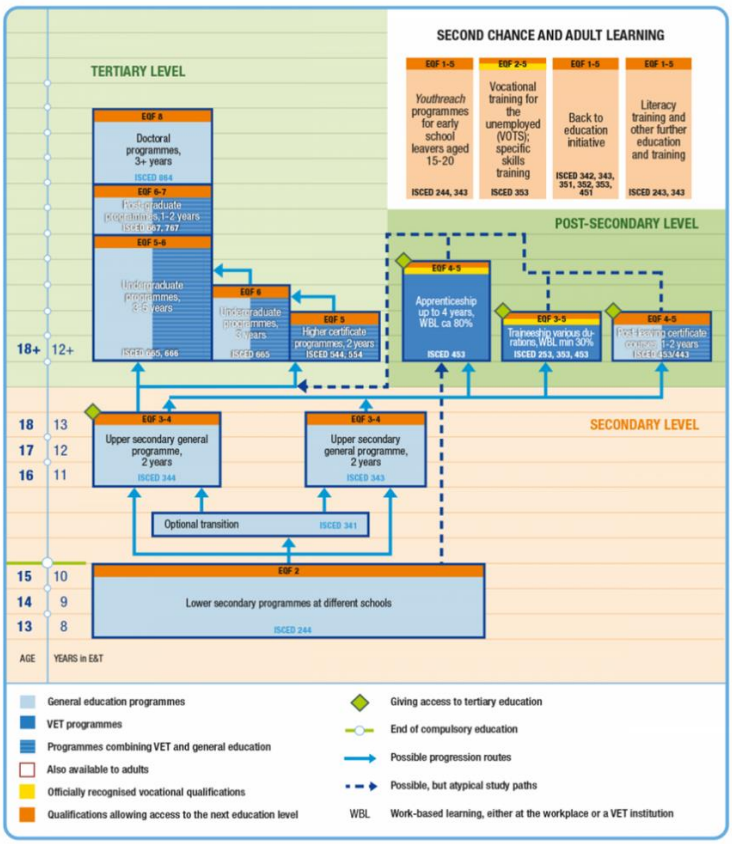
## Ireland

Chart of the national education and training system in Ireland




NB: ISCED-P 2011.
*Source:* Cedefop and ReferNet Ireland, 2019.

VET in Ireland is not usually offered within the second level system (neither lower secondary (NFQ 3, EQF 2, ISCED 244) nor upper secondary (NFQ 4/5, EQF3/4 ISCED 343/344). Therefore, most learners are aged at least 16 or over; since the majority of new entrants to VET have already completed upper secondary education, they tend to be at least 18 years of age.

Providers of Vocational Education and Training

Responsibility for taking decisions and implementing further education and training, which includes most VET provision in Ireland, lies with SOLAS, a government agency, in conjunction with 16 Education and Training Boards (ETBs), who are the VET providers. Both SOLAS and the education and training boards are agencies of the education ministry. This remit was established under the Further Education and Training Act 2013, which was signed into law in July 2013.
VET in Ireland comprises the following main features:

1. most VET is offered by the State, although private providers also play a role.
2. there are four sectors within the education system: (primary, secondary, further education and training (FET) and higher education. VET occurs mostly within the FET sector, meaning that it is offered mostly at post-secondary level.

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3. in 2016, a reform of the apprenticeship system led to the provision of apprenticeships within higher education. VET at tertiary level was introduced in 2016 in the form of apprenticeships.
4. vocational programs are also offered for second chance education and training (in the form of vocational training for the unemployed)
Vocational Training Opportunities Scheme (VTOS) courses consist of a range of full-time courses (EQF 2-5, ISCED 343, 344, 351) designed to meet the education and training needs of unemployed people aged 21 or over. It is offered by the 16 Education and Training Boards (ETBs) throughout the country. Participation in vocational training opportunities scheme courses is in two modes as follows:
1. as a 'core' vocational training opportunities scheme; students participate in a group of up to 20 other vocational training opportunities scheme students in a vocational training opportunities scheme centre or adult education centre.
2. as a 'dispersed' vocational training opportunities scheme; students participate in a group of students, some of whom may be vocational training opportunities scheme students and some of whom will be studying through other schemes/programs (e.g., post leaving certificate course).

- Continuing VET

Further education and training in Ireland comprise post-secondary non-tertiary education, as well as second chance education/training. The sector is characterised by a high degree of diversity in terms of the type of program, level and learner:
1. further education and training programs can be general, vocational or mixed.
2. they lead to awards across several levels on the EQF (levels 1-5 on the European Qualifications Framework (EQF), or levels 1-6 on Ireland's National Framework of Qualifications (NFQ)).
3. target groups include young people who have recently completed upper secondary education, adult learners, early school leavers, the employed, the unemployed, asylum seekers, learners with special needs.
4. post leaving certificate (PLC) programs are aimed primarily at those completing upper secondary education but are also open to older learners; programs are often general in nature, but also include VET programs such as motor technology.
5. second chance learning opportunities within the further education and training sector.

## 1.6.2 Common categories

1. Upper secondary vocational training students. Main providers: Formal Educational System (vocational/technical/ secondary schools), (ages 14+). In Ireland VET training is offered usually after upper secondary education (18+).
2. Initial VET students: Main providers: Public and private vocational training centres (ages 18+).
3. Continuous vocational training students: Compared with initial VET, training is often shorter in Continuous vocational training centres. Main providers: Public and private continuous vocational training centres (ages 18+).

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| Country | Upper-secondary VET providers | Initial VET providers | Continuing VET providers | Adult VET providers |
|---|---|---|---|---|
| **Greece** | School-based VET (EPAL & EPAS) | Initial Vocational Education Centers (IEK) | Continuing Vocational Educational Centres, Non-formal Centres, Lifelong Learning Centres (LLL) | Adult Vocational Educational Centres (KEK) Specialised programs for employed people |
| **Italy** | School-based VET Technical schools Vocational schools | Initial vocational education and training (VET) centres/ institutions five-year programs (EQF level 4) at technical schools (istituti tecnici) & vocational schools (istituti professionali) | VET provided and financed by the private sector/ CVET for skills upgrade by regions or joint interprofessional funds | Provincial Adult Education Centres |
| **Romania** | School-based VET professional schools' Vocational High schools | Post-secondary VET providers<br><br>Technological high schools/colleges post-secondary high schools | Vocational training providers<br><br>Authorised training providers | Adult vocational training providers<br><br>Authorised training providers |

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| | | | | |
|---|---|---|---|---|
| **Spain** | School-based VET: Lower secondary VET programmes/ Intermediate VET | Higher VET/ Higher VET programmes/ Higher sports programme/ Higher arts and design programmes | Outside the school system/ Professional certificate programmes Levels 1, 2 & 3/ Non-formal training centres Public, publicly-funded private and private centres | Outside the school system/ Professional certificate programmes Levels 1, 2 and 3/ Non-formal training Centres Public, publicly-funded private and private centres |
| **Ireland** | Not usually offered (neither lower secondary or upper-secondary level) | Solas and Education Training Boards (state agencies) | Solas and Education Training Boards (state agencies) | Solas and Education Training Boards (state agencies) |

## 1.6.3 Challenges and needs in Developing the "Green Hive" Sustainability Ecosystem

Developing the "Green Hive" online sustainability ecosystem involves creating a digital platform or network that connects various stakeholders, including businesses, organizations, government agencies, and individuals, to address sustainability challenges.

VET experts of the consortium countries may face several challenges and have specific needs while building the "Green Hive" sustainability ecosystem and its localized hubs. These challenges and needs are related to the development and management of sustainable, effective, and inclusive online VET programs. The challenges may include:

1. Multidisciplinary Collaboration: Sustainability issues are complex and interconnected. Building an online ecosystem requires collaboration between experts from various fields, such as environmental science, economics, technology, and social sciences.
2. User Engagement: Ensuring that users actively participate and engage with the ecosystem is crucial. Creating incentives, gamification elements, and user-friendly interfaces are necessary to maintain interest and involvement.
3. Education and Awareness: It's possible that not all VET experts fully understand the total of sustainability concepts or their impact. It's essential that the Green Hive platform provides educational resources and promotes awareness for meaningful engagement.
4. Scaling and Adaptability: Sustainability challenges may vary in each partner country or across regions and change over time. The "Green Hive" sustainability

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ecosystem must be adaptable and scalable to address different issues as they emerge.
5. Community Building: Fostering a strong and active online community is essential. That's why strategies to encourage meaningful interactions and collaborations are necessary.
6. Long-Term Commitment: Building a sustainable online ecosystem requires a long-term commitment for the VET experts, both in terms of resources and dedication.
7. Also, adaptation to emerging technologies and keeping up with new technologies and incorporating them into the ecosystem is crucial for its long-term relevance and effectiveness.
8. Of course, legal and ethical considerations should be taken into account. Legal and ethical issues surrounding data ownership, transparency, and accountability should be properly addressed.

## 1.6.4 Validation

Methodology

The aim of the validation work was to assess, through expert judgment, the following desired characteristics of the Framework:

- **Clarity** - The Framework is written in a clear and understandable manner.
- **Logic** - The Framework is presented and organized in a logical manner.
- **Effectiveness** - The Framework is capable of producing its desired result, such as to provide VET experts with a balanced structure to build localized hubs for sustainability education and be part of the Green Hive ecosystem.
- **Suitability for the target groups**, and therefore initial and continuing VET providers.
- **Comprehensiveness** - The Framework is appropriate to support VET providers in all different stages of building localized hubs.

The respondents were invited to rate 5 statements describing the characteristics on a 4-point Likert scale:
1 - Completely disagree.
2 - Disagree.
3 - Agree.
4 - Completely agree.

**Target groups.** The targeted groups of validation were identified in teachers and trainers of Upper, Post-secondary and Continuing VET institutions of the five countries of the Green Hive Project Consortium: Greece, Italy, Romania, Spain, Ireland. Participants' working sectors and fields were diverse, to favour the collection of multidisciplinary perspectives on the Framework's validity.

**Implementation method.** The validation was carried out in three main phases:

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## 1. Presentation of the Framework

Each partner organisation's researcher presented the Framework to the targeted experts in the Vocational Education and Training field and invite them to provide their evaluation through an online survey.

The presentations were implemented via email, phone interviews or online meetings, and structured as follows:

- introduction of the discussion topic;
- presentation of the Green Hive project and the highlight of the key role the Framework plays in the project;
- presentation of the Framework's structure;
- instructions to read the Framework and to fill in the questionnaire.

## 2. Data collection

A minimum number of 100 questionnaires was required for the validation. Each partner organisation was responsible for promoting participation in the survey at local, regional, and national levels in order to engage min. 20 experts in the VET field.

## 3. Data analysis

The third phase included the recollection, disposition and analysis of the data obtained with the survey. Organization and visual presentation of the results. Data interpretation and conclusions development.

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# 2. A European Ecosystem for Sustainability Education

## 2.1 Why a European Ecosystem for Sustainability Education?

### 2.1.1 Sustainability Challenges

Sustainability and sustainability competences are key priorities in addressing the challenges of our time. Climate change is one of the most urgent and pressing challenges facing humanity, where anthropogenic activities, such as the intensive use of fossil fuels and deforestation, have contributed significantly to the accumulation of greenhouse gases in the atmosphere. Many natural resources, such as water, fertile soil, and mineral reserves, are being depleted due to overuse, with associated exposure to environmental hazards and worsening population health.

Biodiversity plays a critical role in food production and water supply, and its decline threatens food security and ecological stability. The genetic diversity of agricultural crops and livestock is crucial to ensure that crops are resistant to disease and changing environmental conditions. Not only that. It can destabilise ecosystems, increasing the risk of ecological imbalances, undermining water purification, crop pollination and climate regulation, limiting opportunities for new drug discovery, loss of fishing and farming jobs, and even reducing opportunities for discovery and innovation in the life sciences.

Climate change is fuelled by greenhouse gas emissions, often produced by activities that also act as threats to biodiversity and resources. At the same time, climate change can exacerbate the loss of biodiversity through negative changes in environmental conditions.

The promotion of sustainable practices, the adoption and implementation of actions and behaviours that respect the environment and are in line with the conservation of natural resources and the wellbeing of human communities, is therefore not only an act of responsibility towards future generations, but also represents a major impact factor for communities in terms of their ability to cope with traumatic events or crises or, in general, to adapt quickly and effectively to new situations, challenges and contexts, to acquire greater social cohesion and capacity for collaboration among its members. Sustainable practices also promote resource efficiency and diversification, the rational use of water resources and the adoption of renewable energy sources can help avoid resource scarcity crises and can help mitigate the impacts of natural disasters. While, for example, adopting more sustainable urban planning can reduce the risk of floods or landslides, more sustainable agriculture can make crops more resistant to extreme weather conditions.

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## 2.1.2 Technological Context and New Relationship Models

We are currently witnessing a significant transformation in which modern technologies are radically rewriting how different participants interact within various ecosystems. This evolution is driven by a growing commitment to collaboration, transparency, accountability, and innovation. The result is an acceleration of joint efforts to address global challenges and to build a more sustainable future.

Modern technologies act as catalysts, enabling greater connection between individuals, organisations, and governments, promoting the sharing of knowledge and resources. This interconnection has the potential to improve cooperation on a global scale, enabling a more effective response to environmental, social, and economic crises.

Furthermore, the use of modern technologies promotes transparency, making the actions and decisions of the various actors more visible. This increased transparency puts pressure on actors to be more accountable for their actions, encouraging ethical and sustainable behaviour.

Finally, innovation is at the heart of this transformation, as modern technologies enable the creation of advanced solutions to complex problems. This innovative approach is key to tackling global challenges such as climate change, poverty, and public health.

We also have a greater opportunity to create generative contexts, environments and situations that foster growth, development and the emergence of innovative ideas and opportunities.

Artificial Intelligence (AI) and the Internet of Things (IoT) play a crucial role in the real-time acquisition and analysis of immense amounts of data, both environmental and social. This ability to collect real-time data offers the opportunity to make informed and evidence-based decisions, enabling a significant enhancement of initiatives to promote sustainability. In other words, AI and IoT offer the possibility to drive more informed and targeted actions towards the realisation of sustainable goals in the environmental and social domains.

## 2.1.3 Sustainable approaches

At both the individual and community level, however, adopting sustainable approaches is a complex challenge because the environmental, social, and economic problems and root causes are interconnected.

Changing human behaviour and habits is difficult. Adopting sustainable lifestyles often requires a radical change in personal habits and established practices, which can be resisted by many people and organisations. In fact, many people and companies not only seem not to be fully aware of the urgency and importance of sustainability or

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may not fully understand the link between their daily actions and environmental challenges, but also resist change, especially if new behaviours and activities break their routines and comfort zones.

Many environmental problems are long-term in nature and require action on a global scale. Moreover, very often, economic interests' conflict with sustainability goals. Just think of the economies of those countries that are heavily dependent on the export of fossil fuels, generating significant revenues.

The very complexity of solutions can also make effective planning and implementation difficult. Sustainable solutions often require a long-term commitment and may not produce immediate results and often generate knock-on effects. For example, the adoption of renewable energy sources can reduce greenhouse gas emissions, but can also affect the energy sector, employment and energy affordability, and planning and collaboration between various stakeholders, including governments, companies, civil society organisations and individuals can be complex and time-consuming.

A significant shift towards sustainability requires not only advanced policies and technologies, but also a profound cultural transformation. Starting from culture, that system of shared knowledge, beliefs, values, norms, and ethical models, means inscribing in people and communities a common planning to promote values, actions and meanings that encourage responsible and sustainable behaviour at individual and collective level, thus creating a fertile environment to address global challenges, towards a more sustainable future.

## 2.1.4 An (eco)systemic approach to sustainability

A vastly different approach to our traditional linear project management methods is required when projects reach a high degree of complexity. For this reason, Green Hive builds on two fundamental components:

- An ecosystem approach;
- Exchange of knowledge and construction of common meanings.

An ecosystem approach aims to develop a systemic view of the problems and challenges to be addressed. In this way, all parties involved can develop a mutual understanding of the challenges and objectives, allowing opportunities for synergetic responses to be identified in which the actions of one actor can have a positive impact on others. Think, for example, of the reduction of a company's emissions and how the whole community could benefit.

It generates a complementarity of resources, connecting actors with different and often complementary resources, skills, and knowledge: a company might provide financial resources, a non-profit organisation might bring local knowledge and a

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government institution might provide regulations and incentives. Furthermore, an ecosystem and knowledge-based approach allows for the sharing of data, information and models that guide towards a deeper understanding of problems and opportunities. There is also greater shared responsibility through which actors recognise their role in creating a more sustainable future and work together to construct common meanings and goals. The ecosystem approach fosters open innovation, allowing ideas and solutions from various sources to emerge and spread. This leads to an acceleration in the identification and implementation of sustainable solutions and rapid adaptation to changing conditions and contexts, facilitating a more effective response to emergencies and opportunities.

In an economic environment where the only certain element is uncertainty, the only competitive advantage for any organisation lies in its ability to build knowledge around itself. But the creation of new knowledge is not only about processing objective data. On the contrary, it depends on the ability to tap into the often highly subjective insights, perceptions and tacit knowledge of individual actors and communities and make them accessible for examination and use by the entire organisation. The act of inventing new knowledge is not a responsibility reserved for specific departments such as Research and It is to work around deeply ingrained mental models, beliefs and perspectives that are often so embedded in our perception of the world that they limit our ability to embrace change.

## 2.2 The Green Hive Ecosystem: New Relationships and Meanings

The concept of the Green Hive ecosystem was born within an ambitious European project designed to revolutionise sustainability education, through a dynamic network of localised Sustainability Education Hubs, known as 'Green Combs,' and a knowledge platform to connect them, promoting the sharing of information, documents, guides, resources, and knowledge between members of the various communities.

This ecosystem is designed to address critical challenges related to the implementation of the European Union's Competence Framework for Sustainability (GreenComp) and to pursue UN (United Nations) Sustainable Development Goal 13 - "Climate Action."



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Fig.1 Sustainable Goal

Fig.2 European GreenComp

## 2.2.1 General ecosystem functions

**Network and connectivity:** The main function of the Green Hive ecosystem is to create a network that connects the various stakeholders, including educational institutions, students, and external partners, promoting collaboration and knowledge sharing. This network builder function ensures that relevant information and insights are easily accessible to all participants.

**Knowledge transfer and sharing:** The knowledge platform ecosystem has as its overall task the transfer of local experiences, knowledge and innovations related to sustainability education. Facilitating the sharing of good practices, research results and success stories between Green Combs and other stakeholders.

**Capacity building:** One of the central functions is to improve the capacities of vocational education and training (VET) providers and professionals in the field of sustainability education. This includes the provision of training, workshops, and resources to enable educators to effectively teach sustainability concepts.

**Innovation and co-creation:** The Green Hive ecosystem encourages collective action and innovation. It provides spaces and opportunities for students and stakeholders to co-create solutions to sustainability challenges, such as hackathons, challenges, and collaborative projects.

**Promoting sustainability skills:** Ecosystem promotes the development of sustainability skills as defined in the EU GreenComp framework. It ensures that students and educators have the necessary skills and knowledge to effectively address sustainability issues.

A detailed look at the overall structure and functions within the Green Hive Ecosystem is presented below.

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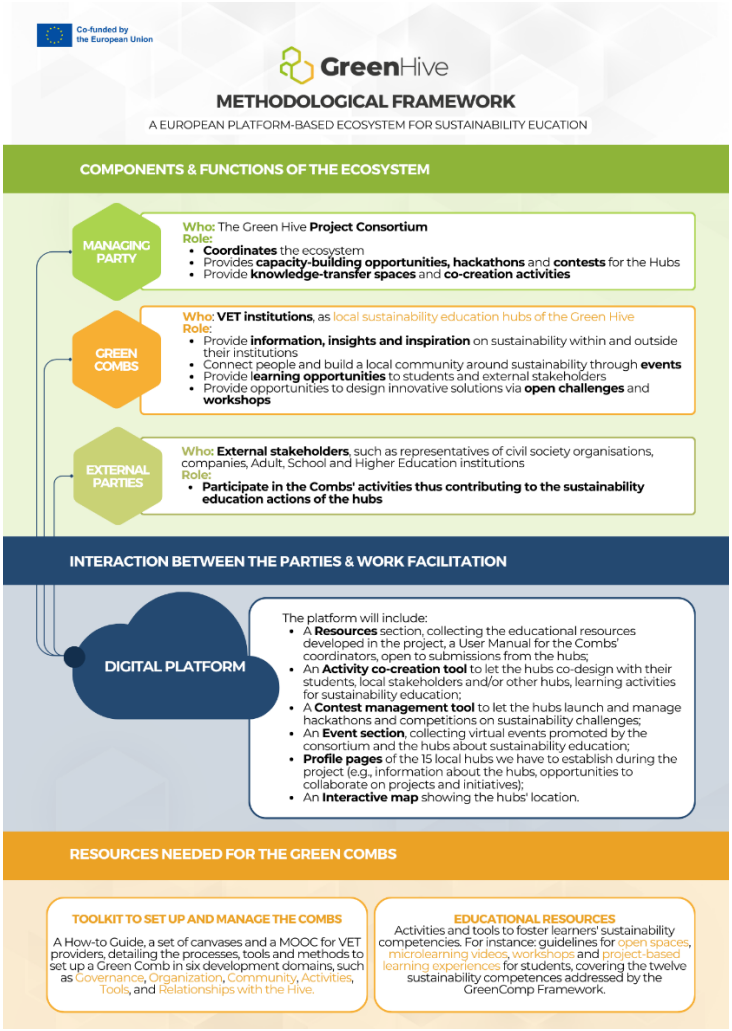


GreenHive

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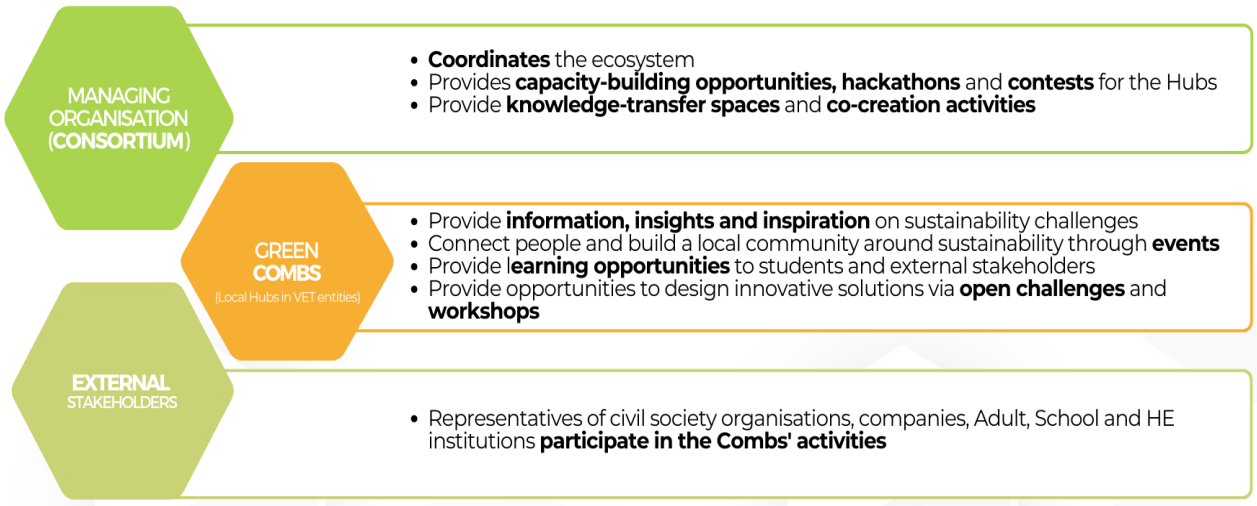
## CONCEPTUAL BASIS OF THE GREEN HIVE ECOSYSTEM

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**Comb Director:** The representative acts as the leader of the hub, playing a vital role. Firstly, he oversees the overall purpose and functioning of the hub. Secondly, he/she acts as a bridge between the wider network and the local group.

**Comb** Team**:** a central team of 3-5 people who manage and organise the activities. together with the Director. From communication to projects, events, and activities.

**Members: Educators** and professionals within vocational training institutions are crucial components as they are responsible for sustainability education. The ecosystem supports their professional development and encourages them to adopt innovative teaching methods.

**What activities do they perform?**

**Providers of sustainability education:** The main function of Green Combs is to offer high-quality sustainability education programmes. These programmes cover a wide range of sustainability topics, including climate change, resource management, renewable energy, and responsible consumption. It organises courses and workshops for teachers and trainers to enhance their skills in sustainability education, as well as providing teaching resources, guides, and best practices to help educators integrate sustainability concepts into their programmes and courses.

**Managing the Green Comb** space on the platform**:** Creates and shares through its own space within the platform, innovative teaching materials and educational resources, interactive tools to engage students in learning about sustainability effectively. Develops microlearning courses dedicated to sustainability education, integrating Green Comp and other recognised standards. It offers courses and learning opportunities that enable students to acquire practical skills related to sustainability.

**Workshops and Collaborative Projects:** Promotes its Green Comb including through the creation of collaborative projects among students, faculty, and community members to address local environmental challenges. Promotes the co-creation of innovative sustainability solutions through open challenges and hackathons. Organises events, conferences, and campaigns to raise awareness of environmental issues in the local community. Establishes partnerships with other educational institutions, non-governmental organisations, and local businesses to expand learning and collaboration opportunities. Actively participates in the Green Hive network to share experiences and good practices at European level.

**Research and Monitoring:** Green Combs are local innovation incubators. They encourage research and development of sustainable solutions to the specific challenges of their area, promoting a culture of innovation among students and the community. They conduct local research and studies to monitor the effectiveness of

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sustainability education initiatives. Share research results to contribute to the growth of knowledge in the field of sustainability.

**Principles of Green Combs Development:**

**Inclusion:** Green Combs must be rooted in the local community, reflecting the specific needs and challenges of the area in which they are located. This principle emphasises the importance of actively involving local stakeholders, including residents, local businesses, and social organisations, in the design and implementation of activities.

**Co-Creation:** Green Combs must adopt a co-creation approach, involving students, educators, and community members in designing educational programmes and identifying innovative solutions to local environmental challenges. This principle promotes active participation and community empowerment.

**Adaptability:** Green Combs must be able to adapt to the changing needs of sustainability education and environmental challenges. This means being open to innovation and change, constantly updating programmes and initiatives to remain relevant.

**Partnership and networking:** Green Combs must establish strong partnerships with other local institutions, non-governmental organisations, companies, and academic institutions. This principle fosters collaboration and the sharing of resources and knowledge within the community.

## 2.2.3 External Stakeholders

Green Hive is a network organisation. This means that it is a collaborative network that enables people and organisations to work together to realise sustainable projects. Therefore, external stakeholders represent interested parties or people to be involved in the projects and activities that are implemented and who have a direct or indirect interest in the results and impacts.

**Who are the members?**

**Educators and trainers:** These are professionals within vocational training institutions who are responsible for sustainability education. They are among the key members of the Green Comb and contribute to the implementation of sustainability education programmes.

**Students:** Students are the main recipients of the sustainability education programmes offered by the Green Comb. They are involved in the practical learning of green skills and the implementation of collaborative projects.

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**Local Community:** The local community is an important stakeholder as the Green Comb aims to engage it through events, workshops, seminars, and collaborative projects. Specifically, this group is represented by citizens, owners of small businesses, shops, restaurants, and other local businesses to implement sustainable business practices and promote green products and services; neighbourhood associations, cultural and arts organisations, environmental volunteer groups, and sports associations, non-profit organisations

**Vocational Training Institutes:** These institutions often host Green Combs and are involved in the management of sustainability education activities within their facilities.

**Local companies:** Local companies can collaborate with the Green Comb to provide practical learning opportunities for students, e.g., through internships or concrete projects related to sustainability.

**Local authorities:** Local authorities can be involved as strategic partners in promoting sustainability at the local level and provide support for Green Comb initiatives.

**Other educational institutions:** Other educational institutions, such as schools and universities, can collaborate with the Green Comb to share resources and knowledge related to sustainability.

**Media:** The media may be interested in the activities of the Green Comb and can help spread awareness about sustainability through media coverage and participation in events.

**What activities do they do?**

**Participation in events and workshops:** Members of the local community can actively participate in events, workshops and seminars organised by the Green Comb to learn and discuss sustainability issues. This participation can contribute to environmental education and awareness-raising.

**Involvement in collaborative projects:** They can collaborate with students, educators, and other members of the local community to address environmental challenges specific to their area. These collaborative projects can lead to innovative solutions for local sustainability.

**Participation in hackathons and open challenges:** Community members can participate in hackathons and open challenges organised by the Green Comb to help solve local environmental problems and promote creativity in the search for sustainable solutions.

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**Sharing knowledge and experience:** They can share their knowledge and experience related to sustainability with other Green Comb members, thus contributing to the growth of knowledge within the community.

**Promotion of Green Comb initiatives:** They can play an active role in promoting Green Comb initiatives within the local community, disseminating information on events, educational programmes, and projects.

**Participation in research and monitoring activities:** If they have specific skills or interests in environmental research, they can participate in local research activities conducted by the Green Comb and contribute to the collection of data and information on local environmental challenges.

**Collaboration with local companies:** They can collaborate with local companies involved in the Green Comb to promote sustainable products and services or participate in corporate social responsibility initiatives.

**Providing feedback and suggestions:** They can provide feedback and suggestions to the Green Comb to improve its activities and initiatives, helping to make the project better suited to the needs of the community.

## 2.2.4 Green Hive Consortium

**What activities does it perform?**

Coordinate the ecosystem. Provides capacity building opportunities, hackathons, and competitions for the Hubs. Provides spaces for knowledge transfer and co-creation activities
Creating a Green Hive Ecosystem for Sustainability Education: A Holistic Vision the Green Hive consortium must have strong coordination and management skills to ensure that the ecosystem functions harmoniously and effectively. The consortium plays a key role in the coordination and management of the ecosystem. It oversees the development of guidelines, provides support for capacity building initiatives, and organises events such as hackathons and competitions to promote innovation.

## 2.3 Knowledge Platform

Knowledge exchange is fundamental to building and sustaining a strong and cohesive community. The creation of a knowledge platform to support ecosystem activities fosters growth, collaboration, and cohesion, helping to create an environment where members can learn, grow, and achieve common goals together.

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The digital platform acts as a central hub of the ecosystem, connecting all Green Combs and stakeholders.

## 2.3.1 Objectives

**Personal and professional growth:** to develop new skills, gain a deeper understanding of topics and improve one's skills, encouraging members to remain active and engaged in the community.

**Sharing experiences:** Users can learn from others and find solutions to their own problems or challenges.

**Community identity building:** Shared knowledge can become a valuable resource for information on related topics, helping to define its identity and reputation.

**Collaboration and common projects:** The exchange of knowledge fosters collaboration between members. When people share information and ideas, they can also identify opportunities for joint projects or initiatives that contribute to community goals.

**Long-term sustainability:** A community based on knowledge sharing is more likely to be sustainable in the long term. The continuous supply of the latest information and the evolution of the knowledge base keeps members interested and motivates them to remain active in the long run.

## 2.3.2 Functionality

**Educational Content:** A rich selection of educational content: articles, practical guides, video courses and interactive webinars. Interactive learning tools, including quizzes, tests, and practical exercises, to help consolidate acquired knowledge and embrace a more sustainable lifestyle.

**Community Building:** Users can create personal profiles and communicate with each other inside discussion forums or noticeboards for discussions on specific topics.

**Events and Webinars: each Green Comb will be able to organise** events, online seminars and webinars related to one of the topics on the platform.

**Thematic Groups and Communities:** users will be given the opportunity to create thematic groups or communities, as well as to publish content and interact with other members with similar interests.
Spaces for the various Green Comb:

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## 2.4 Takeaways

**Urgent Environmental Challenges** Climate change is one of the most urgent and serious challenges. Human activities such as the use of fossil fuels and deforestation contribute to climate change, just as the overuse of natural resources is causing depletion and environmental hazards. Biodiversity is crucial for food production, water resources and ecological stability. Declining biodiversity puts food security and ecosystem health at risk. Genetic diversity is essential for the resistance of crops to disease and changing environmental conditions. Promoting sustainable practices is key to addressing environmental challenges. Sustainable practices contribute to the resilience of human communities and social cohesion. The rational use of resources, renewable energy and sustainable urban planning are examples of sustainable solutions.

**Technological context:** Modern technologies are revolutionising collaboration, transparency, accountability, and innovation across ecosystems. These technologies catalyse global connectedness, promoting cooperation to address global challenges and making the actions of actors visible, encouraging responsible and ethical behaviour. AI and IoT play a key role in gathering real-time data, enabling evidence-based decisions, and improving commitment to environmental and social sustainability.

**Adoption of sustainable approaches:** Adopting sustainable approaches is a complex challenge due to the interconnectedness of environmental, social, and economic issues. Changing behaviour requires radical changes and can be hampered by lack of awareness, resistance to change and conflicting economic interests. Sustainable solutions are long-term and require globally coordinated actions, often generating knock-on effects. Cultural transformation is crucial to promote sustainable behaviour, starting with the promotion of shared values and norms.

**Towards an (Eco)systemic approach:** tackling complex projects requires a different approach based on two fundamental components: an ecosystem approach and the exchange of knowledge to build common meanings. The ecosystem approach promotes shared understanding of challenges, complementarity of resources and shared responsibility, facilitating open innovation and effective response to change. The creation of new knowledge involves subjective insights and perceptions, challenging entrenched mental models to embrace change.

**Green Hive:** The Green Hive ecosystem is designed to promote sustainability education through a network of local hubs known as Green Combs and a knowledge platform. The main functions include networking, knowledge transfer, capacity building, innovation, and the promotion of sustainability skills. Key actors include educators, students, local communities, companies, local authorities, and other educational institutions, who actively participate in events, collaborative projects, and research activities. A Green Hive consortium coordinates and manages the

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ecosystem to ensure effectiveness.

**Knowledge Platform:** The knowledge platform of the Green Hive ecosystem is a central hub that promotes members' personal and professional growth, experience sharing, community identity building, collaboration, and long-term sustainability. Its functionalities include educational content, interactive tools, community building, events, thematic groups, and support for Green Combs. The aim is to foster continuous learning through the active involvement of members.

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# 3. Managing the Ecosystem

## 3.1 Introduction

This chapter clarifies how the central organisation will work and how it will coordinate and facilitate the Green Combs. The managing organisation through the Green Hive digital education ecosystem is intended to provide capacity-building opportunities and knowledge-transfer for the Hubs. Moreover, understanding that green skills will become a requirement of all jobs, the ecosystem will forge the interaction and cooperation between VET providers and labour market players. Together they will co-design activities to develop learners' sustainability skills and, ultimately, adapt VET provision to the green transition. In addition, it would be a great opportunity to offer a space for online events, webinars, hackathons and contests, as well as for transnational cooperation for the Hubs.

## 3.2 Activities of the managing organisation

The Green Hive managing organisation coordinates and engages in a variety of activities to ensure the effective operation and development of the national Green Combs. The specific activities are aligned with organisation's vision, mission, and principles as defined below.

### 3.2.1 General understanding

The Green Hive digital ecosystem is designed to be a long-term transnational cooperation platform among education and training providers, companies and civil society organisations, for the continuous improvement and innovation of sustainability education.

**Fundamental principles**

All members of The Green Hive digital ecosystem shall be guided by its fundamental principles, which are:

- **Integration** – We integrate sustainability principles into all aspects of the organisation's operations, from curriculum development to resource management, to serve as a model of sustainability.

- **Inclusivity** - We ensure that sustainability education is accessible and inclusive, addressing the needs and perspectives of diverse communities.

- **Holistic approach**We recognise the interconnectedness of environmental, social, and economic systems, and promote this perspective in education programs.

Based on this shared understanding, it has been mutually agreed that:

- that Green Comb members shall cooperate with each other in a range of activities for the introduction of innovative digital practices and tools in their training systems to assess and transfer sustainability competences;
- that Green Comb members shall endeavour to achieve measurable and worthwhile outcomes through the Green Hive digital ecosystem;

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- that Green Comb members shall publicise the results of their activities as extensively as possible both within and outside The Green Hive digital ecosystem;
- that the Green Comb shall thereby contribute to the enhancement of GreenComp: the European sustainability competence framework.

**Vision**
The Green Hive digital ecosystem vision is to be a global leader in sustainability education, fostering a future where individuals and communities are empowered to thrive in harmony with our planet.

**Mission**
The Mission of The Green Hive digital ecosystem is:

- to create and maintain a global network of Green Comb members dedicated to building human and organisational capacity in the sustainability sector;
- to provide opportunities for developments in The Green Hive digital ecosystem through scientific research, exchange of good practices and practical approach;
- to develop and support effective education for passing on sustainability skills and knowledge to future generations, improving the knowledge, skills and attitudes to live, work and act in a sustainable manner;
- to disseminate the results of research through publication of useful resources, tips and articles to improve knowledge in the field of sustainability education.

## 3.2.2 Strategic planning

The Green Hive managing organisation develops long-term strategies and goals for the National Green Combs to align with the organisation's mission. This includes setting priorities, defining objectives, and establishing key performance indicators.

As part of strategic planning, The Green Hive managing organisation will periodically revisit and reaffirm the vision and mission statements. Using this approach, they ensure that these accurately reflect the organisation's purpose and long-term aspirations in sustainability education.

The managing organisation also develop strategies and initiatives for achieving each strategic goal. These strategies should outline the actions, resources, and timelines needed to accomplish each goal.

Acknowledging that the perspectives of stakeholders are invaluable in shaping the organisation's direction, the managing organisation will identify relevant key stakeholders and engage them to gather input and insights into the strategic planning process.

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Periodically, they will perform the SWOT analysis to identify the organisation's internal strengths and weaknesses, as well as external opportunities and threats. This is collaboratively developed and discussed to identify strategic priorities.

### 3.2.3 Resource allocation

The Green Hive managing organisation will allocate resources (financial, human, time, information) in accordance with the organisation's priorities.

Firstly, to ensure effective resource allocation the managing organisation will begin by reviewing the organisation's strategic plan and identifying its top priorities. Based on the results, they will know the areas where resources should be allocated first.

The managing organisation will be able to identify all available resources, including financial resources, human resources (keep a register of staff and complementary competencies needed), virtual infrastructure, technology, and educational materials.

They will define the needs for the top priorities and allocate resources, maintaining transparency in resource allocation decisions. The managing organisation can then clearly communicate the rationale behind allocation choices to staff, relevant stakeholders, and the board of directors.

The managing organisation delegates a staff member for monitoring and evaluation of resources to assess the effectiveness of allocations. To ensure that resources are continually optimised the managing organisation reviews and adjusts resource allocation based on changing circumstances, effectiveness, and shifts in strategic priorities.

### 3.2.4 Quality assurance

The Green Hive managing organisation will establish and implement quality assurance mechanisms to monitor and evaluate the performance of National Green Combs. This includes certification processes, assessments, and audits.

The managing organisation defines the requirements for establishment of the National Green Combs including structure and functioning mechanisms. Using this approach, they will provide an opportunity for those local centres that seek certification in the field of sustainability education to join the ecosystem.

The managing organisation defines clear quality standards for National Green Combs and their programs such as: hackathons, contests and competitions.

To ensure that National Green Combs comply with all fundamental principles, relevant regulations and standards in the field of sustainability education, the managing organisation will conduct regular evaluations and assessments.

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## 3.2.5 Support

The Green Hive managing organisation offers support to new National Green Combs in capacity building for existent Hubs and for professional development opportunities. These will be available for teaching staff such as teachers, trainers, career counsellors to develop their sustainability competences.

The managing organisation will assist national centres in complying with standards and regulations to become part of the Green Combs network.

Through organising international contests, knowledge transfer events and hackathons, the managing organisation will facilitate capacity building, networking and collaboration opportunities between National Green Combs.

In addition, the Green Hive digital ecosystem encourages resource sharing among National Green Combs, such as educational materials, best sustainability practices, and teaching methodologies.

Moreover, the staff can benefit from continuous professional development. The managing organisation provides opportunities for staff to access expertise within the ecosystem.

## 3.3 Governance structure of the central unit

The governance structure of the Green Hive managing organisation outlines how the organisation is structured, how it operates, and how decisions are made. In addition, it defines the roles and responsibilities of individuals and groups within the organisation.

## 3.3.1 Management board

**Board of directors**

The board of Green Hive managing organisation is the highest governing body of the managing organisation. It consists of experts who provide strategic direction, oversee organisational activities, and make major decisions. Board members bring expertise in the following fields: education, sustainability, finance, and governance.

**Executive leadership**

The executive leadership team includes the Managing Director who is responsible for the day-to-day management of the organisation. This team oversees the implementation of the board's decisions, sets organisational goals, and manages staff.

**Annual meetings and reporting**

Regular meetings of the board and relevant committees are held to review organisational performance, approve budgets, and make strategic decisions. The annual reports are issued to communicate achievements and challenges to stakeholders.

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## 3.3.2 Operations

Operations roles within the Green Hive managing organisation overseeing efficient functioning of the digital ecosystem. This includes have the following managing structure;

**Virtual infrastructure coordinator**

This role involves managing the virtual infrastructure; ensure the functionalities, visibility and accessibility. In addition, it provides user support and guidance throughout the digital ecosystem.

**Training specialist**

Training specialist design and deliver professional development programs to enhance the sustainability skills and knowledge for the National Green Combs staff. Ensure capacity-building opportunities, hackathons and contests for the Hubs are planned and advertises in advance.

**Stakeholders' manager**

Stakeholders' manager identifies key and relevant stakeholders, collects opinions, ensuring that their voices are heard and considered. Ensure participation of labour market in knowledge-transfer and co-creation activities, and the results are transmitted to National Green Combs.

**Quality assurance coordinator**

This role focuses on promoting sustainable practices within operations and educational programs; ensures the periodical assessments address sustainability and offers guidance for inclusion.

**Data analyst**

This role is crucial to collect, analyse, and interpret data to monitor performance, evaluate educational outcomes, and inform decision-making.

## 3.3.3 Decision making flows

The decision-making flows in the Green Hive managing organisation involve a structured process through which decisions are made at various levels of the organisation.

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The above general decision-making flow will be described in detail with the allocation of roles and responsibilities for each activity that the Green Hive ecosystem provides.

In addition, to clarify roles and responsibilities within each project or process, a RACII matrix will be used to define who is Responsible, Accountable, Consulted, and Informed for each task or activity.

| Activity/Function | Responsible | Accountable | Consulted | Informed |
|---|---|---|---|---|
| Strategic planning | Executive leadership | Board of directors | Senior staff, External consultants | Staff<br><br>Stakeholders |

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| | | | | |
|---|---|---|---|---|
| | (Managing Director) | | | |
| Resource allocation | Data analyst | Board of directors | National Green Combs heads | Program managers<br><br>Staff |
| Quality assurance | Quality assurance coordinator | Executive leadership<br><br>(Managing Director) | Program managers | Staff<br><br>Stakeholders |
| Support | Program managers | Executive leadership<br><br>(Managing Director) | National Green Combs | Students<br><br>Teachers |

## 3.4 Activities the ecosystem and the central platform/ the consortium provide

### 3.4.1 Guidance for new National Green Combs admission

The "Toolkit for the setup and management of Green Combs", including a how-to guide and model canvases to support VET providers in setting up, managing and growing internal hubs for sustainability education will be available.
In addition, the quality assurance coordinator will assist as required to prepare the necessary documentation for newcomers' admission.

### 3.4.2 Professional development opportunities

The "Educational resources for Green Combs", including guidelines will be provided to help staff 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 4 competence areas of the GreenComp. This will be an excellent support for organising knowledge transfer events.

A training specialist will ensure capacity-building opportunities; hackathons and contests for the Hubs are planned and advertises in advance.

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### 3.4.3 Activate co-creation processes for new sustainability skills

The "Green Hive" platform will connect 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 bringing together education, professionals and labour market stakeholders, we ensure the developed skills are relevant and actual.

The stakeholders' manager will help identify key and relevant stakeholders, collect opinions, ensuring that their voices are heard and considered. This will be of help to build local multi-stakeholder hubs to activate co-creation processes for sustainable development.

### 3.4.4 Thematic events: webinars, seminars, hackathons, contest, competitions

The "Green Hive" platform will host and promote at international level the events initiated by National Green Combs. Through this approach, the students would have the opportunity to engage in continuous learning, teachers will be able to share experience contributing to building the community ensuring long-term sustainability.

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# 4. Development principles and functions of the local hubs

## 4.1 Introduction

The principles of many of the topics covered in the other chapters—particularly chapters 2 and 3—are developed further in this chapter. The principles of collaboration and partnerships, the approach to the activities and resources to be mobilised to ensure the sustainability of the local hubs, as well as the principles that should govern the internal organisation of the local hubs, will all receive special consideration.

## 4.2 Organisational structures and governance

### 4.2.1 General principles

To maintain the efficient functioning and growth of the national Green Combs, the controlling organisation for the Green Hive plans, coordinates, and participates in numerous initiatives.

It is important that the coordination structures at each of the local levels and the overall organisational structure maintain a philosophy based on the following principles:

**Inclusion:** The principle of inclusion is fundamental in the development of all proposed activities. It must be ensured that the necessary resources are available to enable various population groups, especially the most vulnerable, to participate in the proposed activities.

**Dynamic:** Social, environmental, and economic issues are closely related, and all these aspects are taken into consideration in the proposed approaches and activities.

**Adaptability:** The context, conditions and problems at the local level must be taken into consideration when proposing activities that are of interest to citizens. From this perspective, without losing the essence of the Green Combs, hubs must be flexible and adaptable to the conditions of the environment.

**Collaboration and exchange:** Collaboration with other entities and stakeholders is fundamental. A balance must be sought in which all the organisations, stakeholders and agents involved can offer their expertise and share knowledge with others regardless of the size of the organisation or the role played in the local community. All entities are necessary, and all contribute with their knowledge.

**Transparency:** All groups, stakeholders and entities participating in the Green Combs are aware of the working principles and decision-making mechanisms.

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**Autonomy:** The Green Combs operate autonomously, taking into consideration the resources available for their sustainability, while being in contact with the global Green Hive network.

**Bottom-up approach:** Mechanisms and structures are created to enhance the participation of citizens and civil society organisations.

**Multidisciplinary:** The existence of different expertise, different approaches will be promoted, creating work teams with diverse backgrounds and knowledge that complement each other.

### 4.2.2 Internal organisation

As mentioned above, the Green Combs will have a long-term strategic plan and a quality plan. They can work together with the objective of having symmetry between the different hubs under the principle of autonomy and adaptability and can include local visions within their strategic plan. However, it should be approved within the board of directors to ensure that all Green Combs share a common vision, mission, values, and objectives.

Internally, the hubs will work under the principles of quality, transparency, and multidisciplinary approaches, bringing together experts from different areas to take into consideration different angles to address the proposed topics and activities.

As far as possible, and to reduce environmental costs, the meetings and work of the management bodies will be online, especially those of the executive bodies. Although this principle is the general rule, if it is deemed necessary, a face-to-face meeting may be held to unblock issues that could not be addressed remotely.

## 4.3 Collaboration and partnerships for local hub development.

Since their creation, one of the guiding principles of the Green Combs has been to collaborate with other stakeholders in being integrated into the local ecosystem. For this reason, a series of guiding principles are necessary in these collaborative relationships.

**Transparency:** It is necessary to know the organisations and stakeholders with which relationships will be established and collaborating organisations themselves accept the guiding principles of the Green Combs mentioned above.

**Contribution:** All entities, whether large, small or with different expertise, contribute to the ecosystem and are necessary. No measure of size or background is established for participation in the Green Combs.

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**Non-profit:** The participation of different entities in the Green Combs will not seek an economic benefit, but an exchange of ideas. However, they can jointly apply for grants or subsidies to guarantee sustainability in the future, being symmetrical relationships within the framework of collaboration and exchange agreements.

**Exchange and excellence:** The Green Combs will seek a greater exchange with organisations, promoting the exchange of lessons learned and best practices to learn from each other.

## 4.4 Activities and approaches

The proposed activities must comply with a series of general principles that are in line with the organisation's own principles, the most important of which are:

**Inclusion:** The proposed activities will seek to encourage the participation of citizens, giving special attention to the most vulnerable groups and establishing methodologies that enhance their participation.

**Button up:** Channels of participation will be sought so that citizens can make proposals, or even manage some activities within the Green Combs, always complying with the philosophy described throughout this chapter.

**Co-creation:** Green Combs will seek to promote participatory approaches where the end users are the main axis of the hubs and where the lessons learned will be close to the citizens.

**Open knowledge:** The knowledge generated in Green Combs will be shared open source so that the public can benefit from it.

**Continuous learning:** In line with the principle of quality, the proposed activities must be presented with quality indicators and evaluation tools so there is continuous improvement.

**Participatory methodology:** Activities that incorporate participatory methodologies and are open source will be sought.

**Innovation:** Green Combs will continuously look for innovative activities that contribute to providing innovative aspects from different perspectives, either by the subject matter, approach, focus, or tools used.

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## 4.5 Resource mobilisation and sustainability

One of the most worrying aspects in the long term is the sustainability of the Green Combs, since some resources are necessary to ensure their can continue their activities in a long term. Taking this aspect into consideration, a series of principles have been established.

**Resource sharing**: Considering that Green Combs are located within the local ecosystem, they can share resources, such as workspaces, with other organisations, thereby reducing costs.

**Search for common resources:** One of the objectives of collaborative networks is to be able to create innovative projects. From this collaborative approach, it is desirable that partnerships can be created to apply for grants and subsidies to develop and maintain the activity.

**Human resources training:** It is important that the staff linked to the Green Combs will be constantly updated. To this end, it is advisable to have a training plan in the most innovative aspects. This training can come from subsidised courses, but also from the exchange of expertise between different professionals and organisations working together in the hub.

**Account transparency:** By virtue of the principle of transparency, it is desirable that there should also be transparency of accounts, where the hub can see where its resources come from and what its sources of financing are.

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# 5. Roles and connectors within the Eco System

## 5.1 Introduction

The principles of the Green Hive Consortium are that of co-creation, participation, adaptability and partnership working to achieve a greener education network. The main function of Green Combs will be to offer high-quality sustainability education programmes. These programmes cover a wide range of sustainability topics, including climate change, resource management, renewable energy and responsible consumption. Member of the Green Combs will be able to undertake courses and workshops for teachers and trainers to enhance their skills in sustainability education, as well as providing teaching resources, guides, and best practices to help other educators integrate sustainability concepts into their programmes and courses.

## 5.2 Roles and connectors within the Eco System

For the success of the project there are certain activities that must happen through the weaving networks of the project consortium; the Green Combs and the Ecosystem. These activities will nurture a connection of educators involved in Vocational and Educational Training (VET), community, local leaders and project partners together. By upholding these principles, Green Combs can create a more holistic and inclusive approach to sustainability education and community engagement, leading to lasting environmental impact and the cultivation of a more resilient and environmentally conscious local community hubs. To do this a number of activities must happen to encourage and foster meaningful practices by understanding the role that each of the participants must take to achieve the Green Hive objectives.

### 5.2.1 Advisory board and committees

**Comb director:** They will provide leadership and strategic direction to the hub, ensuring that the overall purpose and objectives are effectively met.
Acts as a liaison between the hub and the broader network, facilitating communication, collaboration, and the exchange of ideas and best practices. Fosters a collaborative and supportive environment for the team and members, encouraging active engagement and participation in sustainability education initiatives.

**Comb Team:** This can be made up 3- 5 people to manage and coordinate various hub activities, including communication, project management, event organisation, and day-to-day operations. The team will promote a culture of teamwork, creativity, and innovation, fostering a dynamic and inclusive environment for all members and stakeholders involved in the hub's activities.

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**Members:** These will come from educators' professionals from with the VET network who will play a critical role in delivering sustainability education within vocational training institutions, contributing to the development and implementation of innovative teaching methods and practices.

**Steering committee:** through the committee the hub will foster a sense of inclusivity and collaboration, thereby strengthening relationships and engagement with the broader community. Benefits from the ecosystem's support by effectively leveraging the expertise and contributions of the Director, Team, and Members. The sustainable education hub can be more strategic in their decision making, have a greater sense of purpose through evaluation and monitoring and being accountable to their local community through their sustainable education activities.

**Partnership and networking:** Green Combs must establish strong partnerships with other local institutions, non-governmental organisations, companies and academic institutions. This principal fosters collaboration and the sharing of resources and knowledge within the community.

## 5.2.2 Developing inter-communication structures

**Regular communication channels:** To promoting sustainability values and green skills within the education community through the Green Combs hubs, including VET institutions, non-profits, educators, learners, the community and other external stakeholders.

**Improved coordination:** Regular communication ensures that all team members are aligned with the project's goals and objectives. It allows for better coordination and collaboration, reducing the likelihood of misunderstandings and misalignments.

**Timely issue resolution:** Through regular meetings, issues and challenges can be identified and addressed promptly. This helps in preventing potential bottlenecks and ensures that the project stays on track.

**Increased accountability:** Regular communication fosters a sense of accountability among team members. It encourages individuals to take ownership of their tasks and responsibilities, leading to improved productivity and efficiency.

**Celebrating project milestones and sharing successes:** Celebrating project milestones and successes acknowledges the hard work and dedication of the team. It boosts morale, motivates team members, and encourages them to remain committed to achieving future project goals.

**Enhanced stakeholder engagement:** Sharing successes with stakeholders and the community helps build a positive relationship with them. It fosters trust, enhances transparency, and encourages continued support for the project and its objectives.

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**Positive brand image:** Celebrating achievements publicly can contribute to a positive brand image. It showcases the projects capabilities and commitment to delivering successful outcomes, thereby enhancing its reputation within the Green Combs and the Ecosystem.

**Continuous improvement:** Evaluating project outcomes allows for the identification of both successful and unsuccessful strategies. This helps in fostering a culture of continuous improvement within the projects that will filter through to the Green Combs, leading to enhanced performance and efficiency throughout the lifecycle of the project.

**Data-driven decision making:** Evaluating project outcomes provides valuable data that can be used to make informed decisions. Each Green Comb will identify trends, patterns, and areas requiring adjustments and improvements in their own organisation and feedback through the ecosystem to inform decision making at all levels.

## 5.2.3 Nurturing continuous communication channels

**Project Meetings:** Regular team meetings, whether virtual or in-person, provide a platform for discussing project progress, addressing challenges, and fostering collaboration among team members.

**Email Communication:** Email is a fundamental communication tool for sharing detailed information, project updates, and official documentation with both internal team members and external stakeholders.

**Collaboration platforms:** Platforms like Microsoft Teams, offer instant messaging, file sharing, and collaboration features, making it easier for team members to communicate and coordinate their efforts in real-time.

**Video conferencing:** Platforms like Zoom, Google Meet, or Microsoft Teams enable virtual face-to-face interactions, making it easier to conduct meetings, discussions, and presentations, especially when team members are geographically dispersed.

**Newsletters:** Regular newsletters can be used to update stakeholders and the wider community about project developments, achievements, and upcoming initiatives.

**Social media platforms:** Leverage social media platforms such as LinkedIn, Instagram and Facebook to share project updates, milestones, and success stories with a broader audience, thereby increasing project visibility and engagement.

**Feedback mechanisms:** Implement feedback mechanisms such as surveys, suggestion boxes, or feedback forms to gather input from stakeholders and team members, facilitating continuous improvement and addressing potential issues in a timely manner.

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## 5.2.4 Hosting collaborative workshops and seminars

**Relevance and interest:** Selecting relevant topics ensures that the content presented at the workshops and seminars is relevant to the target audience's needs, interests, and current sustainability trends. This will increase attendee engagement and satisfaction.

**Expertise and credibility:** Inviting experts who are well-versed and experienced in the chosen topics enhances the credibility of the event. Their knowledge and insights can provide valuable information and perspectives, making learning events more informative and impactful for the Green Combs and the Ecosystem as a whole.

**Learning and development:** The workshops and seminars must provide valuable learning opportunities for the Green Combs. By focusing on key topics and inviting experts, participants can gain practical knowledge and skills that can be applied to their professional and personal development.

**Marketing and promotion**: Highlighting key topics covered and expert speakers in all promotional materials can attract a more members into the Green Combs and generate interest in the activities around sustainable practices. This can lead to increased attendance and increased participation within the Hubs.

**Community building**: Bringing together the participants in the Green Combs and having like-minded community members interested in specific topics sharing information can lead to future collaborations, partnerships, and continued engagement among participants while meeting local needs.

**Understanding participant experience**: Feedback provides insights into the participants' experiences throughout the project, including what they found valuable, what they enjoyed, and what they would have preferred differently. Understanding these experiences can help in creating more engaging and valuable practices in the future.

## 5.2.5 Sharing Resources

**Creation of a centralised information hub:** Maintaining a centralised online resource hub, accessible to all stakeholders, where relevant information, best practices, and educational materials can be easily accessed and shared. Organise the resources based on categories and topics for easy navigation and retrieval, ensuring that the platform is user-friendly and intuitive for all users.

**Updating stakeholders:** Implement a communication plan to regularly notify stakeholders about newly added resources, updates, and relevant information available on the resource hub. Use a combination of email newsletters, social media

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posts, and targeted announcements to ensure that all stakeholders remain informed and engaged with the latest developments and resources.

**Encouraging stakeholder contribution:** Foster a culture of collaboration and knowledge sharing by actively encouraging the hubs to contribute resources, share their experiences, and highlight best practices within the community through the ecosystem

**Providing training and support:** Offer training sessions and workshops to educate the Hubs on how to effectively utilise the shared resources available on the platform, emphasising best practices and demonstrating how these resources can be integrated into their daily activities.

**Capacity building:** One of the central functions is to improve the capacities of vocational education and training providers and professionals in the field of sustainability education. This includes the provision of training, workshops and resources to enable educators to effectively teach sustainability concepts.

**Innovation and co-creation:** The Green Hive ecosystem encourages collective action and innovation. It provides spaces and opportunities for students and stakeholders to co-create solutions to sustainability challenges, such as hackathons, challenges and collaborative projects.

**Promoting sustainability skills:** Ecosystem promotes the development of sustainability skills as defined in the EU GreenComp framework. It ensures that students and educators have the necessary skills and knowledge to effectively address sustainability issues.

## 5.2.6 Creating cross institutional partnerships

**Knowledge and Resource Sharing:** Hubs can share knowledge, research, and resources, enabling them to leverage each other's strengths and expertise. This collaboration fosters a more comprehensive and diverse learning environment that benefits both educators' students and the community.

**Expanded Research Opportunities:** Partnering organisations will continue to collaborate on Green Hive allowing for the pooling of resources, data, and expertise.

**Increased Funding Opportunities:** There is the potential for the Green Combs to jointly apply for grants, funding, and research opportunities that may not have been accessible to them individually. This collaborative approach increases the likelihood of securing funding for various initiatives and research projects.

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**Global Perspective and Networks:** Partnerships with institutions across different regions or countries can provide a global perspective and facilitate the establishment of international networks through the ecosystem.

**Improved Reputation and Recognition:** Cross-institutional partnerships often lead to enhanced visibility, reputation, and recognition for the project.

**Addressing Complex Challenges:** Combs are expected to adopt a co-creation approach to the learning and partnership working allow institutions to tackle complex challenges together. By working together, institutions can develop innovative solutions to developing green skills within the educational, environmental, and technological that may have been beyond the score of any one hub.

## 5.2.7 Encouraging community engagement events

**Workshops and educational seminars:** Organise workshops and seminars focusing on sustainable living, energy conservation, waste reduction, and eco-friendly practices within society and showcase how these can be implemented into the education setting and through the hub curriculum.

**Awareness Campaigns and Competitions:** Launch awareness campaigns and competitions such as hackathons within the combs focused on sustainability, such as recycling challenges, energy-saving contests, and eco-friendly design competitions. Encourage active participation from community members of all ages to promote sustainable habits. Create hashtags and online challenges to encourage the hubs to participate and share their sustainable practices and initiatives.

**Collaborative Networking and Discussion Forums: Inclusion:** Green Combs must be rooted in the local community, reflecting the specific needs and challenges of the area in which they are located. Encourage the space for Green Comb hubs to have a method that brings together local leaders, businesses, and residents to discuss sustainability initiatives, share best practices, and explore collaborative opportunities for promoting environmental conservation.

**Partnerships with Schools and Educational Institutions:** On a country level partner with schools, NGO's and VET institutions through the Green Combs to integrate sustainability education into the curriculum and organise joint awareness programs, workshops, and environmental projects involving students, teachers, and parents. Use these networks to feed into the ecosystem of knowledge and practice sharing.

**Online Campaigns and Social Media Engagement:** Utilise social media platforms and online campaigns to spread awareness about sustainability in the Combs, share informative content, and encourage active engagement throughout the ecosystem. Create hashtags and online challenges to encourage the community to participate and share their sustainable practices and initiatives.

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