



# 5P Competences

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# Competence Framework

Sustainability Skills in Adult Education



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In the following chapters, we present the competence framework for Sustainable Action developed within the European 5P-Competences Project. The competence framework is one of the main tools developed as part of the 5P Competences Project. It serves as a comprehensive guide for anyone concerned with the development of teaching / learning for sustainable development. Its focus is on skills and competences relevant to sustainable development from a lifelong learning perspective.

The project brings together education and training providers, non-governmental organisations and municipalities from five European countries. These project partners are dedicated to advancing Education for Sustainable Development (ESD) by developing a structured and well-defined competence framework and promoting its integration into adult education for sustainable development.

For more than thirty years, the United Nations has been actively advocating for sustainable development, formulating 17 goals with the aim of achieving them by 2030. The subsequent Incheon Declaration places special emphasis on education and training, designating them as crucial components in this collective effort.

Achieving these goals requires more than just changes in the educational system, focusing not only on ensuring a fair distribution of education and improving learning outcomes. It is equally crucial to attain pertinent educational objectives and develop relevant competences. To support that the GreenComp competence framework was established in 2022 (EU-Commission, 2022) and learning objectives were published in 2017 (UNESCO, 2017). Common to these two publications, as well as similar ones, is their foundation in sustainable development as such. From this they are asking for learning objectives that can be deduced, such as understanding concepts of poverty and engaging in critical discussions about their normative and cultural assumptions. Moreover, they call for the development of relevant competences needed to actively contribute to sustainable development such as respect for sustainability and the ability to critically engage in discussions related to it.

Without a doubt, those publications contributed to a better understanding of the competences needed to build sustainable societies. However, they also raise questions.

To name just a few, the learning objectives and competencies proposed here are so general that they could be formulated even without any reference to sustainability. The justification for the relevance of learning objectives and competences, such as 'systems-thinking competency,' 'strategic competency,' or 'self-awareness competency' (UNESCO, 2017, p. 10), does not necessarily hinge on the concept of sustainability. Consequently, educational innovations would not be necessary either, as these learning objectives and competences have always been relevant.

It is also noticeable that the learning objectives defined are primarily connected to formal learning at schools and universities, while the connection between lifelong learning and sustainability remains rather vague, despite rhetorical proclamations. Those objectives can be incorporated into a catalog, describing skills and competences which are generally important. However, this catalog may not necessarily be linked to real-life problems or situations encountered in everyday life. However, it's every day life that is the major impetus for lifelong learning.

This impression is reinforced by the fact that while there is a wide range of proposals for implementing education for sustainability, the majority of them are tailored to the needs of the formal education system.

In contrast to competence frameworks for sustainable development that focus on imparting sustainability competencies within the formal education system, our emphasis is on lifelong learning, and consequently, on informal and non-formal learning. The advantage of this perspective lies in the fact that informal learning, unlike formal learning, arises directly from the everyday experiences of adults. To achieve the broadest possible impact, as unanimously advocated by local and regional stakeholders, adult education for sustainable development at local level must precisely address this point.

## **The focus on lifelong learning**

In this project, our focus is on a lifelong-learning perspective. Before delving into the project's design, it's crucial to explore the implications of this viewpoint. Despite (or perhaps because of) our frequent use of terms like 'lifelong-learning' or 'informal learning' in everyday language, there exist significant variations in their meanings. Recent publications, exemplified by Rohs (2015), highlight that the term 'informal learning'

can be broadly defined as any learning that is not formal. Informal learning then serves as a residual category, representing learning outside organized contexts.

Alternatively, some definitions trace the origin of the term 'informal learning' to the field of vocational occupation and training, emphasizing on-the-job learning and the distinction between general and vocational education. In this context, informal learning also plays a pivotal role in organizational learning (Senge, 1990). Another perspective on the definition of 'informal learning' originates from the European Projects 'Learning Regions' or 'Learning in Place,' contextualizing informal learning within regional development. Here, 'informal learning' emerges as a significant element of regional task-orientation (Kuper & Kaufmann, 2010). Overall, the understanding of 'informal learning' largely depends on the political background associated with the term, resulting in variations across European countries.

To adhere to a widely accepted definition, we rely on recent empirical studies on lifelong learning and informal learning, particularly referencing the Adult Education Survey. The following definitions can be found on EUROSTAT's websites<sup>1</sup>:

**“Lifelong learning** encompasses all learning activities undertaken throughout life with the aim of improving knowledge, skills and competences, within personal, civic, social or employment-related perspectives. The intention or aim to learn is the critical point that distinguishes these activities from non-learning activities, such as cultural or sporting activities.” (Eurostat, 2016)

According to this definition, 'lifelong learning' persists throughout an individual's entire life, pursued with the explicit goal of improving knowledge, skills, and competences. Consequently, learning that occurs by chance is not considered relevant to 'lifelong learning.' These learn-

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<sup>1</sup> [https://ec.europa.eu/eurostat/cache/metadata/en/trng\\_aes\\_12m0\\_esms.htm](https://ec.europa.eu/eurostat/cache/metadata/en/trng_aes_12m0_esms.htm)

ing activities are categorized into three distinct groups: formal, non-formal, and informal. The definitions for each category are outlined as follows:

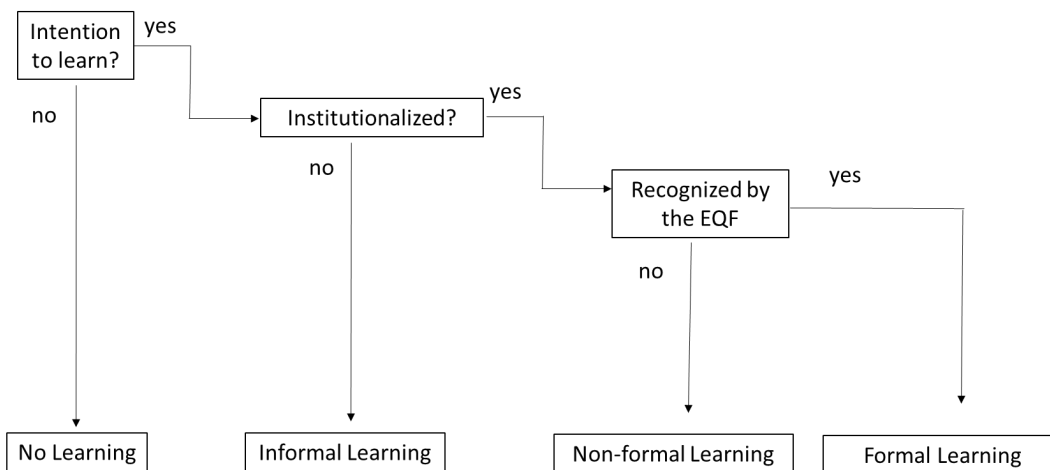
- **Formal education and training** are defined as “education that is *institutionalised, intentional and planned through* public organisations and recognised private bodies and – in their totality – constitute *the formal education system* of a country. Formal education programmes are thus recognised as such by the relevant national education authorities or equivalent authorities, e.g. any other institution in cooperation with the national or sub-national education authorities. Formal education consists mostly of initial education. Vocational education, special needs education and some parts of adult education are often recognised as being part of the formal education system.” (ISCED 2011)
- **Non-formal education and training** is defined as “education that is *institutionalised, intentional and planned by an education provider*. The defining characteristic of non-formal education is that it is an addition, alternative and/or complement to formal education within the process of the lifelong learning of individuals. It is often provided to guarantee the right of access to education for all. It caters to people of all ages but does not necessarily apply a continuous pathway-structure; it may be short in duration and/or low-intensity, and it is typically provided in the form of short courses, workshops or seminars. Non-formal education mostly leads to qualifications that are not recognised as formal or equivalent to formal qualifications by the relevant national or sub-national education authorities or to no qualifications at all. Non-formal education can cover programmes contributing to adult and youth literacy and education for out-of-school children, as well as programmes on life skills, work skills, and social or cultural development.” (ISCED 2011) In short, non-formal education and training



covers *institutionalised taught learning activities outside the formal education system*.

- **Informal learning** is defined as “forms of learning that are *intentional* or deliberate, but are *not institutionalised*. It is consequently less organized and less structured than either formal or non-formal education. Informal learning may include learning activities that occur in the family, workplace, local community and daily life, on a self-directed, family-directed or socially-directed basis”. (ISCED 2011)

For a clearer grasp of the fundamental distinctions among formal, non-formal, and informal learning, the definitions can be visually represented. According to Bilger et al. (2013, p. 19), a flowchart, as outlined in the Classification of Learning Activities (CLA) by Eurostat (2016, p. 21), can be created. This visual aid aims to foster a shared understanding of the various types of learning:



This understanding can be applied to define the term **‘Education for sustainable development’** (ESD). In the words of the UNESCO (2014, p. 12), “ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just so-

ciety, for present and future generations, while respecting cultural diversity. It is about lifelong learning, and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society.” The definition also implies two key aspects: a) Environmental and Sustainable Development (ESD) can be pursued through formal, non-formal, and informal learning, and b) it necessitates intentionality: the purpose of making informed decisions and undertaking responsible actions for environmental integrity, economic viability, and social justice. This conceptualization of ESD aligns with recent publications by Wals & Mochizuki (2017) and Rieckmann & Barth (2022). Wals & Mochizuki emphasize a gap in knowledge regarding ESD within the realm of non-formal education.

Consequently, the project's intent to establish a competency framework for ESD enters a field with limited research, particularly in the domain of non-formal education. Since informal learning is closely tied to practical actions in daily life (be it occupational, private, or societal), the competency framework must prioritize knowledge that serves as a precondition for these actions. It should not focus on knowledge arising as a consequence of these actions, as the latter does not align with informal learning, given its non-intentional nature.

### **Implications for learning objectives from the lifelong learning perspective and the concept of developmental tasks**

From the perspective of lifelong learning, as described earlier, the learning objectives formulated for formal learning fall short in addressing the needs of informal learning. This is due to several reasons:

- The learning objectives and competences are often formulated in a very general manner, lacking a specific justification for their relevance to concepts like sustainability, such as 'systems-thinking

competency,' 'strategic competency,' or 'self-awareness competency' (UNESCO, 2017, p. 10). Consequently, the argument arises that educational innovations are not necessarily required since the objectives have always been relevant.

- Educational objectives are primarily linked to formal learning settings in schools and universities. While they can be integrated into a catalog outlining general skills and competences, this catalog may not be directly connected to problems or situations encountered in everyday life - the very context that drives informal learning.
- It is (almost) impossible to derive actionable insights for pedagogical interventions from analytical categories that justify the weighting of educational objectives (or competences) for individual learners or determine the sequence in which different parts of the competences can or should be taught.

Therefore, from a Lifelong Learning perspective, it is imperative to augment existing competence frameworks (or lists of educational objectives) with a concept grounded in everyday situations, including professional contexts. The objective of this project is to establish a competence framework aligned with UNO and UNESCO publications, reflecting current developments in our partner countries and community activities. The framework should remain open and adaptable to new trends, with a primary focus on informal learning.

To achieve this goal, we will build upon the concept of developmental tasks widely utilized in developmental psychology. Originally, this concept refers to culturally or societally determined expectations at a specific point in time for individuals of a certain age. Havighurst (1972), a notable proponent of this concept, applied it to adolescents, outlining tasks such as preparing for a professional career, readiness for marriage

and family, adaptation of sex roles, acceptance of one's own body and person, and achieving emotional independence from parents and other adults.

Havighurst himself emphasizes the adaptability of this concept across various life stages. For early adulthood, tasks may include choosing a life partner, establishing a family, managing a home, and building a career. In middle age, individuals may focus on maintaining a standard of living, fulfilling civic and social responsibilities, sustaining a relationship with a spouse, and adapting to physiological changes. Later in maturity, tasks may shift towards adjusting to deteriorating health, transitioning to retirement, fulfilling social and civil obligations, and coping with the loss of a spouse.

Building on Havighurst's work, Hurrelmann (1998) further refines the concept, approaching it from a socialization perspective that is closely aligned with informal learning. Hurrelmann identifies four developmental tasks:

- **Training of discipline and intellectual and social competences:** Actively assuming tasks and duties that are personally satisfying and contribute to public welfare.
- **Designing a self-image of body and soul:** Developing a personal identity, fostering close connections with loved ones, and maintaining satisfying contacts with others.
- **Developing skills to productively use economic, leisure, and media offerings:** Creating strategies for relaxation and regeneration.
- **Designing a value orientation and developing the ability to participate actively in the political shaping of living conditions.**

In developmental psychology and theory of socialization, the inquiry into the repercussions for adolescents who fail to successfully navigate developmental tasks is common. Here, we apply the concept of developmental tasks to lifelong learning, a notion akin to Hericks (2009), who employs the concept in his theory of teacher professionalization. In this context, we refer to tasks that must be acquired and updated throughout the entire lifespan, closely linked to the perspective of sustainability. If this ongoing acquisition and updating do not occur sufficiently, it is not just the individual who is adversely affected; it is the sustainability itself.

Starting from a literary review that besides many others included the publications of the OECD three core aspects (learning objectives) for Education for Sustainable Development (ESD) were identified: Generation, justice and responsibility.

1. The topic of **generation** is closely connected to sustainability and is explicitly mentioned in GreenComp, the European sustainability competence framework (supporting fairness, p. 14). The idea is that each generation lives in, or learns to live in, a world shaped and designed by previous generations. They inherit this world from their predecessors, preserving certain aspects while modifying others, with the ultimate goal of passing on the world to the next generation or generations.

One of the prerequisites for sustainable development is to be conscious of this aspect and to approach it critically and responsibly. This pertains to the overall history of humanity, the nation one resides in, family, and one's personal history. Norms and values must be scrutinized and brought to consciousness. Individuals need to ask themselves what legacy they wish to leave for their own children, the children of their friends, their community, their country, and the world.

Within the framework of the Sustainable Development Goals (SDGs) of the United Nations, this aspect is particularly emphasized in SDG 8 (Decent Work and Economic Growth). Additionally, relevant goals include SDG 1-3 (No Poverty, Zero Hunger, Good Health and Wellbeing), SDG 5-12 (Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry Innovation and Infrastructure, Sustainable Cities and Communities, Responsible Consumption and Production), and SDG 16 (Peace, Justice, and Strong Institutions).

2. **Justice** is explicitly mentioned in competences of the Green-Comp. It is directly referred to in three SDGs (SDG 5: Gender Equality, SDG 10: Reduced Inequality, and SDG 16: Peace, Justice and Strong Institutions) and it is implicitly referred to in some other goals (SDG 1: No Poverty or SDG 2: Zero Hunger). Justice is discussed as justice between nations, between regions and between persons. Closely connected to this are questions about equality and inequality. Those questions relate to the distribution of natural resources, the organization of power or domination.
3. **Responsibility** was already addressed by Havighurst (1948) and Hurrelmann (1995). Sustainability just is another aspect of responsibility. It means being responsible for one's own actions, for one's own values and one's engagement for sustainability. This is addressed in the competency framework, too (Valuing Sustainability or Political Agency and Collective Action), but it is also expressed in the SDGs. It is about being and feeling responsible for others and the conditions for having a 'good life'. So, it is also strongly connected with the question of generations.

## **Sustainability competences as developmental tasks**

Out of these topics three developmental goals can be drawn that are described in the following paragraphs:

### **1. Existence and Continuance of the World:**

The first developmental task (material resources) is aiming at the existence and the continuity of the world. This pertains to one's own future, the future of the society and the future of forthcoming generations. The main question posed is: on what (material) basis can this future be designed? This underscores the importance of resource management. The developmental task in this context is, to acquire the skills of effectively managing our material resources to allow for a worthwhile and sustainable future, as persons, other persons and societies at large.

### **2. Social Cohesion and Justice:**

The second developmental task (social cohesion / justice / social fairness) is focusing on the social cohesion of a society, interpersonal relationships, and the outcomes of comparing oneself to others. It revolves around the concepts of fairness and the values associated with it. The developmental task in this context is to cultivate social values and formulate a concept of social fairness.

### **3. Self-Efficacy and Active Engagement for Sustainability:**

The third developmental task (self-efficacy) is connected to one's own position in the world. This is not ascribed as it might have been the case in former times, it is earned, and it can be assured by one's own efforts. Therefore, it is important to be convinced of one's own self-efficacy and to be engaged in sustainability as far as one's own abilities and interests allow that.

The three developmental tasks have in common, that they cannot be achieved finally. They have to be thought over the whole lifetime, they have to be modified and updated and some competences have to be learnt newly. Concerning the aspect of lifelong learning this does not happen independently from one's own life. The opposite is true: it happens it happens enclosed in one's own life, and therefore is intricately interwoven with it. This is the reason why in this project initiatives and projects are collected and analysed which are undertaken in connection with these developmental tasks on a national and on a regional level.

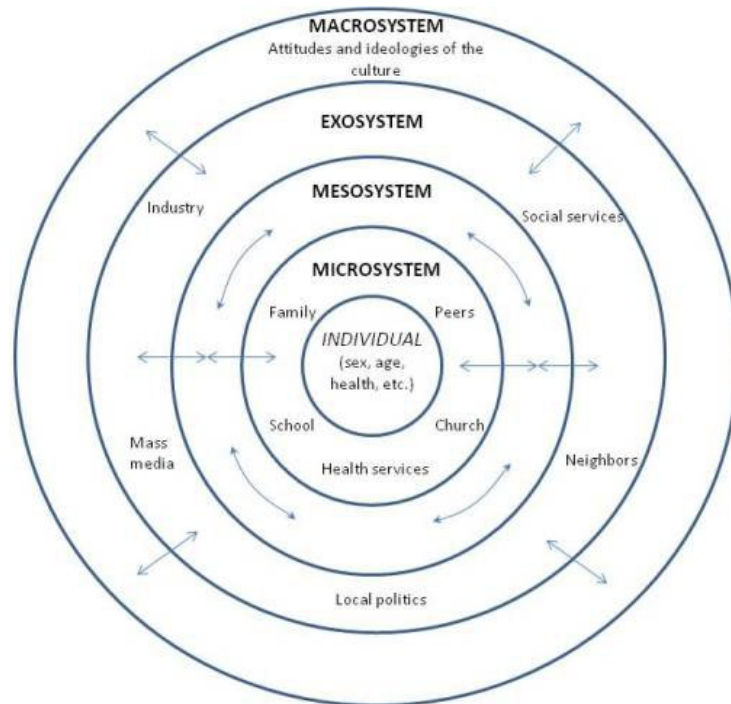
The project initially aimed to analyze international, national, and regional publications on Education for Sustainable Development (ESD) to identify specific goals for the competence framework, with a focus on regional differentiation. This approach was aligned with the UNESCO's roadmap for ESD implementation (2020), emphasizing efforts at the local level using a whole-institution approach (p. 16, also p. 22).

However, it became apparent that this intention could not be realized due to the fact that publications at the national and regional levels all referenced the central publications of the UNESCO. Consequently, a decision was made to analyze concrete initiatives and projects undertaken in the countries of the project members.

While the analysis of developmental tasks could be conducted using project descriptions, it posed a challenge to draw from those descriptions a direct line to the regional level, since projects could operate at regional, national, or international levels.

Given the importance attributed to the regional level by UNESCO (2020), reference was made to Bronfenbrenner's social ecological model (1981). This model categorizes various ecological systems with different influences on the cognitive and social development of individuals, particularly children. The graphical illustration of the model is one of many, depicting the interconnectedness of these systems.





With regard to those three tasks the following levels of action can be distinguished:

- **Micro level**

whether the development tasks are addressed by sustainability action that takes place in a person's immediate personal environment, i.e. primarily affect the person themselves,

- **Meso level**

whether they are aiming at a person's environment that is in direct, personal contact with him or her, such as the family or immediate circle of friends,

- **Exo level**

whether they address groups or events in a person's immediate environment of which the person is not a member or in which the per-

son is not involved, but which have a significant influence on the person's options for action, such as changes in the possibilities for sustainable consumption or sustainable energy use.

- **Macro level**

or whether it refers to things that prevail in a society as a whole, such as values, conventions, traditions, regulations, laws or ideologies (macro level).

Consequently, the analysis aims to culminate in a competence framework for sustainable development within the realm of lifelong learning. However, it's crucial to note that this framework, being grounded in empirical analysis rather than theoretical considerations, may not encompass the complete spectrum of competences required to comprehensively support sustainable development in all its facets. To address this, the empirical framework later on is juxtaposed with a well-established theoretical framework from other contexts that can be adapted. The chosen theoretical framework is the competence atlas by Heyse & Erpenbeck (2017). The rationale behind this choice will be elucidated in the subsequent discussion, which explores various conceptualizations of the term 'competence.'

## **Catalogue of sustainability competences**

The partnership produced a catalogue of competences, which correspond to the development tasks outlined before. In essence those skills and competences were identified using an inductive approach. In particular, by analyzing citizen-driven initiatives on different levels that address sustainability issues. We coded the initiatives as follows:

**Classification:** according to a) the developmental task the project focuses on (material resources, self-efficacy, justice/social fairness) and b) the level of impact (micro-level, meso-level, exo-level, macro-level),

**Goals of the civic initiative:** For example: avoiding waste, ecological friendly cooking, ecological sensible purchase of food, keeping the city clean etc.

**Teachable competences that can be deduced from the goals:** For example: Knowledge about and handling of material resources, knowledge about the attributes of food, knowledge about how to buy ecological friendly food, getting a feeling of togetherness by meeting many like-minded persons, getting a sense of responsibility for the well-being and image of the city by realizing that the group can make a difference.

**Psychological distance of sustainability actions:** Independently from the coding of the competences it is important to mention the level, the citizen initiatives are aiming at, the psychological distance of sustainability actions, and the goals connected with them. According to Bronfenbrenner's socio-ecological socialisation theory (Bronfenbrenner 1981) the following differentiations are important (to illustrate this point, we provide examples from the analysis of German initiatives).

### **Micro level**

- Actions that are directly connected to a person or those who are in a direct contact with her.

Example: Rehab republic (<https://rehab-republic.de/>) because it addresses concrete persons to take part in the actions such as organizing Trash-Cleanups, ESD-Workshops, Zero-Waste Meeting Points, clothing exchange meetings and diverse workshops such as cooking in groups with foods that would've been thrown away

otherwise. They also organize a sustainable city festival “Yeah!” offering such mentioned activities during on one day.

### **Meso level**

- Actions aiming at the (personal) environment of a person, including for example persons who are closely connected to each other such as e.g. family or close friends.

Example: Bergwaldprojekt (<https://www.bergwaldprojekt.de/>). This project allows volunteers to gather for a weekend or a week inside a forest in Germany. There they will help plant new trees and take care for the existing forest (e.g. in the subproject “Neihaufeschte (Pflanztage)” or “planting days” in English). The organisation provides accommodation, tools and food, as well as a workshop on how to plant trees correctly and then supervises the volunteers during their work. It is coded as a meso-level project, since it involves the individual volunteers and their relationship to the group they are cooperating with.

### **Exo level**

- Actions referring to groups or events in the direct environment of a person. An environment in which persons are not a member by themselves, but which has a strong effect on the possibilities of action, such as changes for sustainable consumption or sustainable usage of energy.

Example: Community Kitchen in Share (<https://www.br.de/nachrichten/bayern/die-community-kitchen-lebensmittel-retten-fuers-klima,T034FGv>) because it provides food for the people and children of a certain region.

## Macro level

- Actions aiming at things that relate to the whole of a society, such as values, conventions, traditions, rules and regulations, laws or ideologies.

Example: Girls Day/Boys Day

([https://www.bmbf.de/bmbf/de/forschung/gleichstellung-und-  
vielfalt-im-wissenschaftssystem/girls-day/girls-day-maedchen-  
zukunftstag.html](https://www.bmbf.de/bmbf/de/forschung/gleichstellung-und-vielfalt-im-wissenschaftssystem/girls-day/girls-day-maedchen-zukunftstag.html)) This project offers children the opportunity to discover jobs that are traditionally “not for girls” or “not for boys”. The children get one day off of school for participating in this project and receive the opportunity to “work” for one day in a job they are interested in (for example in a kindergarten, a media company, a construction site, in a research facility, ...) to learn that specific jobs are not only for one gender and to get more ideas about what they would like to do or learn in their own future. As the project – besides other goals – is aiming at societal changes of values on “appropriate” jobs for different genders and operates on the macro-level here.

More than three quarters of the projects can be attributed to the micro level, which is corresponding to the fact, that the focus of the project is on informal learning. Nearly 37 % of the projects are connected to the macro level. That means that they are aiming at a political level. Most of the projects are affecting more than one level.

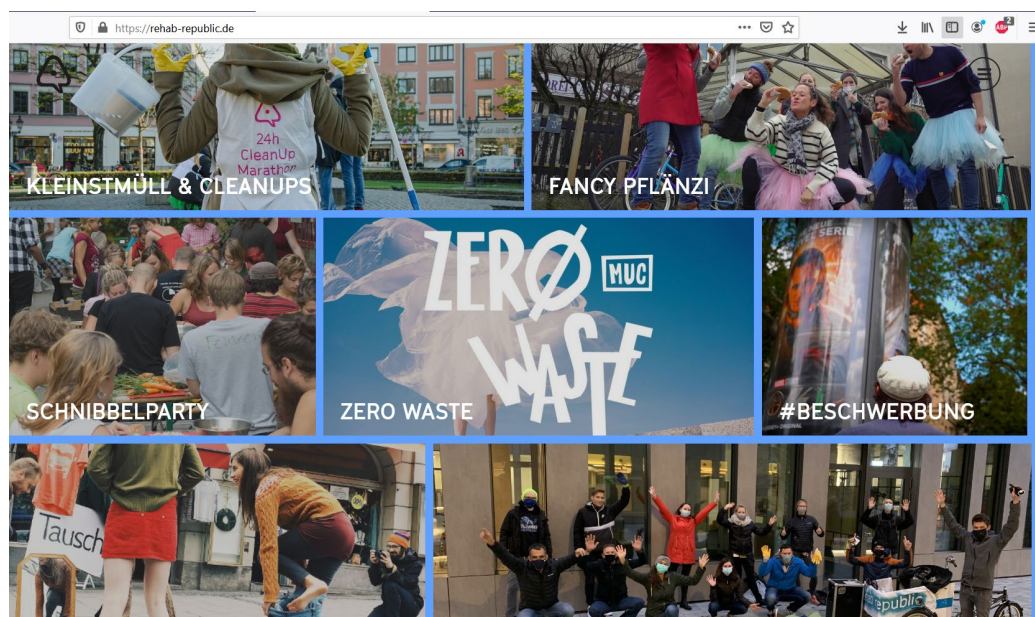
Similar to that are the results concerning the developmental tasks. Most of the projects (75 %) are aiming at competences concerning material resources, 54 % on competences concerning self-efficacy and 56 % on competences concerning social values.

An example of this approach is provided on the next page.

## Rehab Republic

<https://rehab-republic.de/>

This collective organizes Trash-Cleanups, ESD-Workshops, Zero-Waste Meeting Points, clothing exchange meetings and diverse workshops such as cooking in groups with foods that would've been thrown away otherwise. They also organize a sustainable city festival “Yeah!” offering such mentioned activities during on one day.



### Classification

The project is mainly focussing on **material resources (1)**, because it is clearly focussing on resources: food, clothing, cooking. It is also aiming at **social cohesion (2)**, because it is organizing social events and so trying to give people the feeling of cohesion.

The project is located on the **micro-level**, because it addresses concrete persons to take part in the actions. It is also located on the **meso- and exo-level**, because it tries to create social events for friends and people in a certain region.

### **Goals of the civic initiative**

- Avoiding waste
- Ecological friendly cooking
- Ecological sensible purchase of food
- Keeping the city clean

### **Teachable competences that can be deduced from of the goals:**

- Knowledge about and handling of material resources.
- Knowledge about the attributes of food.
- Knowledge about how to buy ecological friendly food.
- Getting a feeling of togetherness by meeting many like-minded persons
- Getting a feeling of responsibility for the well-being and image of the city by realizing that the group can make a difference.

Local sustainability actions and initiatives can be categorized using this method, both in terms of their contribution to the development tasks, the competences they convey, and their scope. An advantage of this approach can be seen in its applicability beyond our project. For instance, it can be used in the development of educational programs in the field of Education for Sustainable Development (ESD), as well as in the planning of local ESD strategies.

Following the findings from our analysis the sustainability competences and sub-competences can be mapped as follows. Besides a basic definition (D), we described each competence with the aid of three descriptors: Knowledge (K), Skills (S) and Attitudes (A). Moreover, we provided examples to illustrate the competences (E).

## **Competences concerning material resources**

### **Competences to sustainably handle items of every-day use**

**D:** To manage items that we are using in our every-day-life (such as clothes, paper, water) in a sustainable way means that we take care of their life cycle. This implies being informed about where they are coming from, how they were produced and how they are distributed, or how they can be acquired. As well as treating things carefully, using them in a sustainable way, avoiding waste, and disposing them in a way that fits into a natural life cycle.

**K:** Having the necessary information about local and global items and objects used in daily life, their origin, the ecological footprint of their production and transport/distribution. Knowing about options of how to acquire these things and how to use them while considering the lifecycle of the products in use. Knowledge of how to capitalize on local products to avoid the excessive costs of export products.

**S:** Being able to use every-day-items properly, parsimoniously, and in an ecological way. Having the necessary skills to consider ecological aspects in using things and to put them into an ecological life cycle.

**A** Being committed to respecting and incorporating ecological aspects in every-day-life and in objects of daily use.

### **E**

- Knowledge about the negative effects of water pollution
- Knowledge about different forms of composting
- Skills related to biodiversity protection
- Skills for combating pollution (e.g. in rivers or the ocean)
- Skills about possible consequences of environmental changes on the earth's biosphere
- Skills about the importance of vegetation in urban areas
- Skills about planning and caring for trees
- Skills related to gardening at home



## **Competences for recycling, zero waste, and emission management**

- D** These competences contain the knowledge necessary for participation in product cycles (e.g. recycling), avoiding waste and an ecological friendly way of handling emissions. The competences are especially related to the motivation for own action and for improving both private and public behaviour.
- K** Knowledge about the properties of things used in everyday life and options for their ecological use, such as technical procedures of parsimonious heating and necessary tools for this, the ecological footprint of things, procedures of recycling things of daily use or (e.g. buying second hand products), or how to dispose things correct and avoid waste.
- S** Persons can select among different options with the aim to minimize their ecological footprint concerning energy (e.g. heating or travelling) and concerning tool use or reuse in daily life. They are able to integrate things of their daily use into ecological friendly cycles at the place they are living.
- A** Persons are aware of their own contribution to pollution and want to reduce their ecological footprint. They are open for innovative technologies and techniques to reduce pollution of air, water and soil. They want to undertake efforts to reduce pollution.
- E**
- Skills about concepts such as sustainability, gas emissions, pollution, global warming, ecology
  - Skills about classification, sorting and recycling of litter
  - Skills related to sustainable transport
  - Skills related to urban biodiversity
  - Skills of resources for a more sustainable city
  - Willingness to make efforts to reduce pollution.

## **Competences for sustainable nutrition**

- D** Persons with competences for sustainable nutrition are able to grow or to buy food in a healthy and sustainable way. They know about the relevant classifications of food and healthy ingredients. They can prepare and cook in a healthy way, and they know about ways of balanced nutrition and its necessity. Furthermore, they are able to dispose the rests of their food in a sustainable way.
- K** Knowing how to grow food in an ecological way or where and how to buy ecological friendly food, the classifications of food and the meaning of ingredients (e.g. of labelling). They know about balanced nutrition and its importance, as well as corresponding recipes for healthy food preparation and methods for managing the leftovers or kitchen waste.
- S** Having the necessary farming skills to grow food in a healthy way. Being able to buy necessary ingredients, prepare healthy meals and handling leftovers while avoiding waste.
- A** Interest to live healthy and to act for one's own well-being and the well-being of one's family and the society as a whole. Commitment to prepare food in a healthy way.
- E**
- Knowledge about food processing
  - Knowledge about healthy nutrition including understanding of balance, timing and variety
  - Knowledge about buying of ecological friendly food
  - Skills needed to build a garden
  - Skills to buy ecological friendly food
  - Skills about planting and caring for trees
  - Engagement on sustainable patterns of food consumption and production

## **Competences necessary to understand the scientific background of ecology**

- D** To keep up with the current knowledge and techniques supporting sustainable living it is important to address scientific discovery. This is also important to understand interrelations between different aspects of living and of regional differences to come to an own opinion.
- K** Understanding of scientific concepts and terms concerning different aspects of living, their intercorrelation and relevant regional differences; Knowing where and how to access scientific information to solve concrete problems and knowing how to take this as a basis for one's own argumentation.
- S** Persons are able to read or to listen to scientific publications and can integrate this knowledge into their own concepts. They can build a critical view on scientific discovery (e.g. being able to distinguish between scientific and non-scientific knowledge) and can draw practical conclusions, own argumentation, and scientifically informed actions from it.
- A** Persons are interested in scientific discovery, want to stay informed thoroughly on specific topics, and take part in discussions on specific topics.
- E**
- Skills about topics of sustainable development from a scientific perspective
  - Understanding of scientific backgrounds of attributes, consequences, and action plans
  - Skills about causes and effects of climate change
  - Knowledge about balance between consumption and resources
  - Scientific skills about plant ecosystems
  - Skills about the healthy development of local communities
  - Understanding of concepts of equality and equity

## **Competences for integrating Education for Sustainable Development into educational activities**

**D** These competences are important to spread the knowledge and competences concerning sustainable development within formal and non-formal learning activities. This also includes competences to establish and support online-learning activities.

**K** Knowledge about effective learning and teaching methods. Knowledge about the importance of informal learning and how to facilitate informal learning-activities. Knowledge of institutions already engaged in Education for Sustainable Development (ESD) and how to further support them.

**S** Ability to act as role model for sustainable development and to lead by example. Being able to explain complex contexts to interested persons in a passionate way, for example through design or selection of appropriate learning activities such as online-courses.

**A** Engagement in teaching. Passion to disseminate knowledge and experience on sustainable development.

**E**

- Skills concerning fundamental personal competences, including skills about self-regulation, flexibility, and wellbeing
- Skills about self-reflection on the topic of human rights education, in relation to citizenship education based on the 'Framework for the Key Citizenship Competences'
- Knowledge about curriculum development on the topic of environmental sustainability
- Skills about implementation of citizenship education in EU countries based on the 'Framework for the Key Citizenship Competences'
- Skills about staff training on sustainability
- Skills on how to help learners to develop sustainability

- Knowledge of methods on the application of human rights education, in relation to e.g. children, culture and sports, or the environment

### **Competences for integrating Education for Sustainable Development into political and entrepreneurial activities**

**D** Education for Sustainable Development (ESD) allows every human being to acquire the knowledge, skills, attitudes, and values necessary to shape a sustainable future. To bring ESD further it is important not only to apply the strategies on a personal level but also at work, together with friends, the community and – on a political level – to engage in local and national politics.

**K** Knowledge of formal and informal structures in relevant institutions and their relevance as well of their interdependence. Knowledge of the decision-making processes at work and in local and national politics.

**S** Skills necessary to understand (social) systems and to create and organize networks. Skills to convince persons to participate in sustainable development. Being able to organize shared actions in the field of sustainable development. Networking and Entrepreneurial skills. Leadership skills. Being able to engage concretely, together with other people in public activities.

**A** Engagement for sustainable development in private and public contexts. Political interest and will for own engagement in sharing knowledge and experiences with sustainable development. The willingness to use own ideas in actions and to contribute to change.

**E**

- Experience in collaborating with local communities and large partnerships on the topics like justice, human rights, sustainable development, and democratic participation

- Knowledge about tools for political advocacy on the topics like justice, human rights, sustainable development, and democratic participation
- Knowledge about applying ESD training frameworks for teams and organisations to their own settings and purpose
- Knowledge about local and wider community cooperation on the topic of environmental sustainability

## **Competences concerning social values**

### **Sense of belonging to the world (Sustainability values)**

- D** Perceiving and understanding oneself as part of the world and the critical reflection on this. Being part of a group is central for the development of values and to act within one's community. This includes the reflection of one's own role as an individual as part of different communities and society as a whole, as well as an understanding of how relationships and groups form and develop. The development of values also includes learning about other persons values, to understand, discuss, and respect these in order to create shared values and applying them as basis for shared sustainable action and visions for a more sustainable future.
- K** These competences contain knowledge about values and their relevance to persons thinking and behaviour as well as to group dynamics. They also include knowledge about how individual and societal values interrelate with sustainable behaviour and why such behaviour is relevant for the world (e.g. through how climate change impacts different social groups)
- S** People can communicate with others, build and maintain relationships, develop their own personality as individual and as part of a group and the world. They can reflect on and show empathy for own and other's values as well as debate diverging principles.

**A** People are aware of their contributions to a group and their potential impact to their community, they are open for being an active part of a group and take on responsibilities. They are curious and willed to listen to perspectives and ideas of others, including those of minorities. They are aware of the concept of sustainable goals (SDGs) and willing to participate in resolving unsustainable problems.

**E**

- Skills about fundamental social competences, including skills about empathy, communication, and collaboration
- Skills about values, skills, and attitudes of mutual respect in accordance with human rights and democracy
- Skills about how to embody sustainability values
- Skills about solving problems through teamwork
- Getting a feeling of togetherness by meeting many like-minded persons
- Getting a feeling of togetherness by cooperating with like-minded persons
- Reflecting about the own value to visit side in all parts of the world and its impact on sustainability
- Knowledge about SDGs and their implementation in the own local social communities

## **Conscientiousness (Awareness)**

- D** Developing a more sustainable way of living requires awareness of current changes in the world that call for more sustainability. Understanding the influence an individual person can have on their community, local politics and direct surroundings can be a key towards implementing sustainable change in one's own everyday life and to start learning necessary skills. This includes the ability to understanding one's responsibility for own actions and the state of one's environment and the ability to act accordingly. These competences also include an openness for new information and for learning especially about the interconnected systems in one's direct surrounding and to keep up with new issues and ideas.
- K** These competences contain knowledge about how people, their behaviours and their local or global environment are interconnected. They also include an understanding of one's own perception and how this (in-)forms one's opinion and how to search for and find information.
- S** These competences contain skills concerning self-awareness, self-reflection, and self-efficacy. This includes the critical reflection of own perceptions and concepts, the search for and differentiation of trustworthy from unreliable information and the critical integration of new information into one's own concepts.
- A** Persons are open for taking responsibility for challenging tasks, are willed to face inconvenient truths and to both learning or teaching new things. They pay attention to their environment and other people and seek exchange and new information.
- E**
- Understanding how own actions can make an impact
  - Develop a sense of responsibility in favour of the protection of the planet's ecosystems and for a clean environment



- Feeling of responsibility for the well-being of one's city and the neighbourhood
- Ability to identify barriers that prevent people from having equal rights and living in dignity
- Skills about enacting one's citizen's rights
- Getting a feeling of responsibility to mobilize local authorities to implement the 2030 Agenda in their towns
- Feeling of responsibility for taught topics
- To become aware of generated marine pollution
- Awareness about pollution dangers
- Social conscience about sustainable transport

### **Participation and Inclusion**

**D** Developing a more inclusive society that allows participation of minor groups, young people and for example people from rural areas. This includes persons to actively engaging others, their ideas, and critical discussions of perspectives, as well as making Education for Sustainable Development accessible. It also includes an increased awareness of societal and political structures (both local and national).

**K** knowledge about societal structures and societal minorities, the local and national political systems, as well as existing options for participation and how to create new ways for participation.

**S** Engaging others in participatory action, develop shared visions of sustainability.

**A** Openness for learning, new perspectives, and respectful interaction.

**E**

- Skills about values, skills, and attitudes of mutual respect in accordance with human rights and democracy

## **Social adaptability**

- D** The ability to adapt to new situations, people or information, including active transfer of knowledge and skills for example to solve problems or educate target groups on how to adapt a more sustainable way of living.
- K** These competences contain knowledge about one's own resources and how knowledge can be transferred, communicated or shared.
- S** These competences contain skills concerning self-reflection and the ability to teach and transfer knowledge.
- A** Persons are perceptive of their (social) environment and are willed to focus on unknown or challenging things and to learn or teach others.
- E**
- Understanding that the own actions can make a difference
  - Raising awareness and spread the culture of sustainability
  - Skills about fundamental social competences, including skills about empathy, communication, and collaboration

## **Competences concerning self-efficacy**

### **Evaluation of one's own sustainable actions (Role distance)**

- D** To evaluate one's sustainable action in private, social, and political life in relation to own and societal expectations.
- K** Knowledge about differentiated impact of sustainable actions at local and global level in the ecological, economic, and social dimension and how to evaluate the impact on local and global level
- S** Being able to estimate the impact of sustainable action, being able to reflect critically on the own action and being able to deduct and initiate or propose corrective action
- A** Openness for critical thought and opinion; Openness for self-reflection

### **Empowerment**

- D** Empowerment means to encourage people to take charge of their lives and to be active citizens. With regards to sustainable action this can happen through the integration of Sustainable Development Goals into the personal social network (at work, personal networks, local community among others). It is important to show enthusiasm and commitment to one's values and by this one can inspire others to get engaged for sustainable development as well.
- K** Knowledge about own resources and about how oneself and other people can be motivated for taking up actions and how to sustain both motivation and action. Knowledge about Social Development Goals and possibilities of their implementation into daily live. Knowledge about how knowledge can be shared.

**S** If someone is an empowering person, they can excite others to engage in a topic, to change their behaviour, and/or to participate in movements concerning sustainable development. It includes reflecting on and increasing self-determination.

**A** An empowering person must have self-determination, social interest and willingness for engagement with relevant topics and self-development. This can also include persuasive skills and empathy.

**E**

- Skills on strategies aiming at changing from “awareness” to “active engagement” that will strengthen the capacities of citizens, trainers, local authorities and civil society organisations.

### **Perseverance**

**D** Perseverance can be understood as an essential element of self-management. It is a competence to motivate oneself to continue with one’s activities and to take over responsibility for the actions undertaken by oneself and from others.

**K** Understanding on psychological barriers of perseverance and how to address them.

**S** Patience and endurance. Leadership. Competence of being active and holding on in doing one’s own things. Taking over responsibility. Carry others along and working together over a long time.

**A** People are not only used to take strong efforts to reach their goals, but they also continue their efforts after having failed. They are strongly convinced that patience and endurance are important to reach their goals and that they will be successful.

**E**

- Activist capacities

## **Cooperation competences (Solidarity)**

- D** Cooperation is a central aspect in sustainable action which requires shared efforts at local levels in concrete activities and initiatives. These competences include intra and interpersonal skills, such as ambiguity tolerance, authentic value orientation and the ability to solve conflicts to successfully work on tasks in teams and create solutions and shared visions for a more sustainable future. These competences are also required to sustain cooperation activities between persons and within projects and includes teaching and learning activities.
- K** These competences contain knowledge about how people act and think, how groups function and how people can help each other to learn. For any cooperation with regards to initiatives it is important to understand one's partners to stay connected with them even if there are difficulties.
- S** Persons can participate in the definition of sustainable goals. They can communicate with others, find their own role in a group (e.g. as leader), build and maintain relationships, develop solutions to problems together. They can uphold contact to relevant persons and show central skills such as empathy, stress and ambiguity tolerance, role distance.
- A** Persons have an interest on others and understand that actions are often more effective if people work together. For this a sense of solidarity and reciprocity is essential. Persons are aware of their own standpoints and can negotiate shared goals and maintain the intention to solve problems together. They are open to contributions from others and maintain a flexible way of thinking to find good compromises.
- E**
- Competences of social cooperation for sustainable cities and their well-being

- Getting a feeling of responsibility for the well-being and image of the city by realizing that the group can make a difference
- Feeling of togetherness with like-minded persons and solidarity
- Developing an attitude of togetherness by meeting many people with similar goals
- Skills about civic participation
- Understanding group dynamics
- Knowing the local social networks

### **Organizational competences**

**D** These competences are important for being well organized as a person – for example for creating a structured plan of actions, to pursue a target and to manage projects.

**K** Understanding of how to divide problems into sub-problems which can be solved and others for which a solution needs to be developed. Knowledge on how to conduct structured planning of ways to find solutions for the problems at hand.

**S** Skills necessary to solve problems, Coordinating activities of different persons. Ability of being a leader and thinking ahead in terms of setting goals for an initiative.

**A** People are convinced that success is not a matter of fate or good luck, but rather a matter of effort. Also, they are willed to take effort in a structured and rational way.

### **E**

- Competences for organizing advocacy events
- Organizational skills
- Skills of the organisation and management of waste collection

## The Competence Model

As said earlier, the beforementioned competences are grounded in empirical analysis rather than theoretical considerations, and therefore may not encompass the complete spectrum of competences required to comprehensively support sustainable development in all its facets. To address this, the empirical framework later on is juxtaposed with a well-established theoretical framework from other contexts that can be adapted. The chosen theoretical framework is the competence atlas by Heyse & Erpenbeck (2017). The rationale behind this choice will be elucidated in the subsequent discussion, which explores various conceptualizations of the term 'competence.'

### How the concept of competence is understood in this project

The term 'competence' has been employed in various pedagogical contexts over recent decades. Depending on the context—whether in vocational education, assessing literacy in schools, or establishing a shared understanding of basic skills in EU countries—divergent interpretations of the term 'competences' emerge. A widely accepted perspective views competences as cognitive skills and proficiency that are both attainable and teachable. These encompass a person's ability to solve problems, along with the motivational, volitional, and social readiness and capabilities to address these solutions successfully and responsibly (see Weinert, 2002, p. 27). Meigel (2022) categorizes the differences in understanding into three groups:

1. **Generalized Capacities (OECD):** This interpretation of the term 'competences' aligns with the German Qualification Reference Framework (DQR), rooted in the European Qualification Framework (EQF). Similar to the EQF, the DQR features eight levels with a distinct structure. The DQR, however, refines and specifies the EQF by

expanding on its categories and competence descriptions in more explicit terms. While the EQF comprises three categories (1. Knowledge, 2. Skills, and 3. Responsibility and Autonomy), the DQR introduces four categories (1. Knowledge, 2. Skills, equivalent to professional competence, 3. Social competences, and 4. Independence, akin to personal competence) (BMBF, 2011). This underscores the German education system's commitment to a holistic understanding of competence. The four-category structure was chosen to effectively articulate a comprehensive ability to act in all its facets. Both the EQF and DQR view competences as learning outcomes, rooted in the idea that there is alignment between (professional) activities and the requisite competences.

- 2. Definitions for Cognitive Skills (PISA, PIRLS, PIAAC):** Another perspective on competences is evident in international studies such as PISA, PIRLS, or PIAAC. In these studies, there is a clear distinction between cognitive and motivational components of competences. The focus in competence descriptions is primarily on the cognitive elements that can be taught in schools or other formal and non-formal learning institutions. Consequently, this viewpoint leads to a more precise understanding of competences concentrated on specific domains or situations (Klieme & Hartig, 2007). Competences, in this context, are seen as functional, facilitating a clear differentiation from more general terms like intelligence or talent.
- 3. Competences as Dispositions for Self-Organization:** In this interpretation, competences are viewed as a person's ability to successfully navigate open, incalculable, complex, and dynamic situations through self-organization (Heyse & Erpenbeck, 2004). In simpler terms, competences represent the predisposition to organize oneself, enabling individuals to adapt to concrete situations and changing conditions by adjusting their behavioral strategies effectively (Heyse & Erpenbeck, 2004). This understanding aligns well with the concept of informal learning, emphasizing that individuals define



their learning goals independently. Similar to informal learning, competences are rooted in self-determination. Key principles include their non-linear development, self-reinforcement, as competences lead to the development of new ones through new experiences. Additionally, competences depend on factors within individuals, not external elements (environment), and are influenced by internalized values, personal development, and individual history.

As demonstrated, the concept of competences as dispositions for self-organization aligns well with the notion of informal learning. In a cyclical process, it influences (and is influenced by) mental actions, such as problem-solving or assessment, physical actions like working or manufacturing, communicative actions, and reflexive actions like self-assessment. These competences prove especially crucial in situations where established routines are unavailable. Consequently, self-organized actions have a reflexive impact on the individual (personal competence), the social environment (social and communicative competence), the objective environment (domain and method-related competence), and one's motivation and endurance (activation and action competences).

Given both the competence model and sustainability competences, we then were able to define the 4 main dimensions of the competence framework, which pretty much reflect the categories of the EQF (European Qualification Framework for Lifelong Learning) and DQR (German Qualification Framework for Lifelong Learning), in spite of different terms used. And they are as well matching with the developmental tasks explained before.

Following this, a person needs (1) personal competences, (2) social-communicative competences, (3) domain and method-related competences, as well as (4) action competences to live and act in a sustainable way.

- **Personal competences (P)** are dispositions within the individual leading to self-organized action. They encompass the ability to assess oneself, to reflect on oneself as a person and to develop own individual values, motivation and standpoints. This is as well affecting gifts, motivation, creativity and learning.
- **Social and communicative competences (S)** are dispositions to collaborate with others in a self-organized, cooperative and communicative way. The behaviour of a person is orientated on groups and relationships to others in order to create shared action-plans to develop joined tasks and objectives. Social and communicative competences are important to put coordinated actions on a stable ground.
- **Domain and method related competences (F):** These dispositions are the conditions for a self-organized, accurate, objective and domain-based problem solving. This is depending on professional and methodological knowledge and on the capability to develop this knowledge further in a creative way.
- **Activation and action competences (A)** are dispositions to put the other competences into action. This means to integrate the personal, social-communicative and domain related competences of a person into his or her personal motives and endurance.

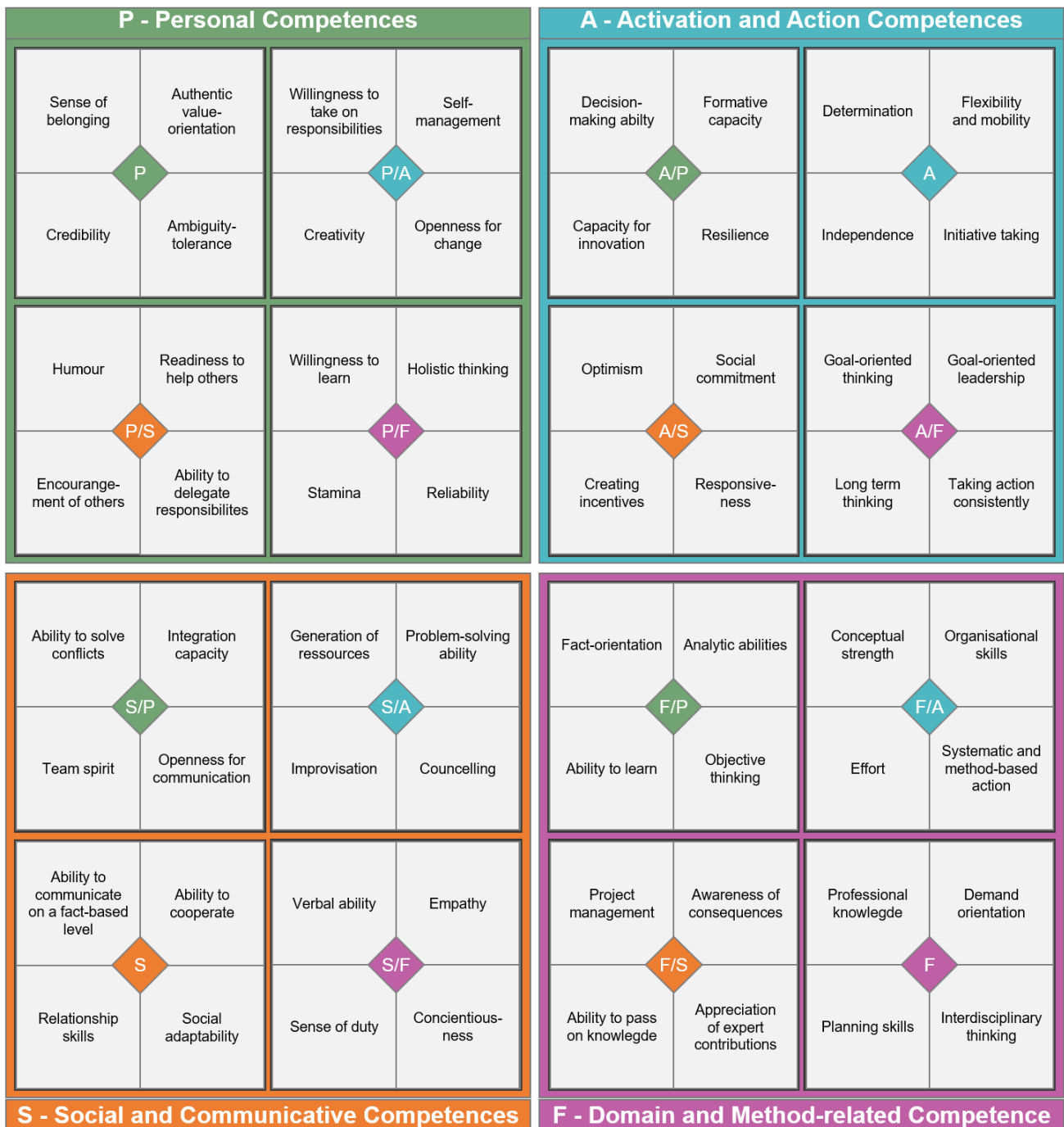
Those four basic competences can be further subdivided, as it is shown by Heyse and Erpenbeck (2017) for the field of occupational research.

## **The Competence Atlas**

Based on the work of Heyse and Erpenbeck (2017), we elaborated a "Competence Atlas" which suggests eight partial competences in each dimension, making a total of 64 partial competences.

What makes this matrix relevant for this project is – besides the reasons mentioned above – the fact that they can be adapted to different sustainability topics. The following graphic shows the personal competences, social-communicative competences, domain- and method-related competences as well as action competences of the competence-atlas, adapted to the characteristics of both, informal / non-formal learning and education for sustainable development. The single competences cannot be derived by a logical deduction from basic competences. Instead, they represent a mixture of the basic competences with a varying individual focus.

Adapting the model from Heyse and Erpenbeck (2017) to informal learning in the field of sustainability, the following matrix (competence atlas) can be formulated:



On the basis of Hezse, V. & Erpenbeck, L. (2017). KODE® KompetenzAtlas

Figure 1: Competence Atlas for Sustainable Development

In the next step the three above mentioned developmental tasks (material resources, social cohesion / justice / social fairness, self-efficacy; see also the definitions above) can be integrated into the model as it is shown by the colours red, yellow and green in the next figure. Again, the mapping cannot be done clearly and unambiguously, but it is plausible.

- Self-efficacy
- Material resources
- Social cohesion / Justice / Social fairness

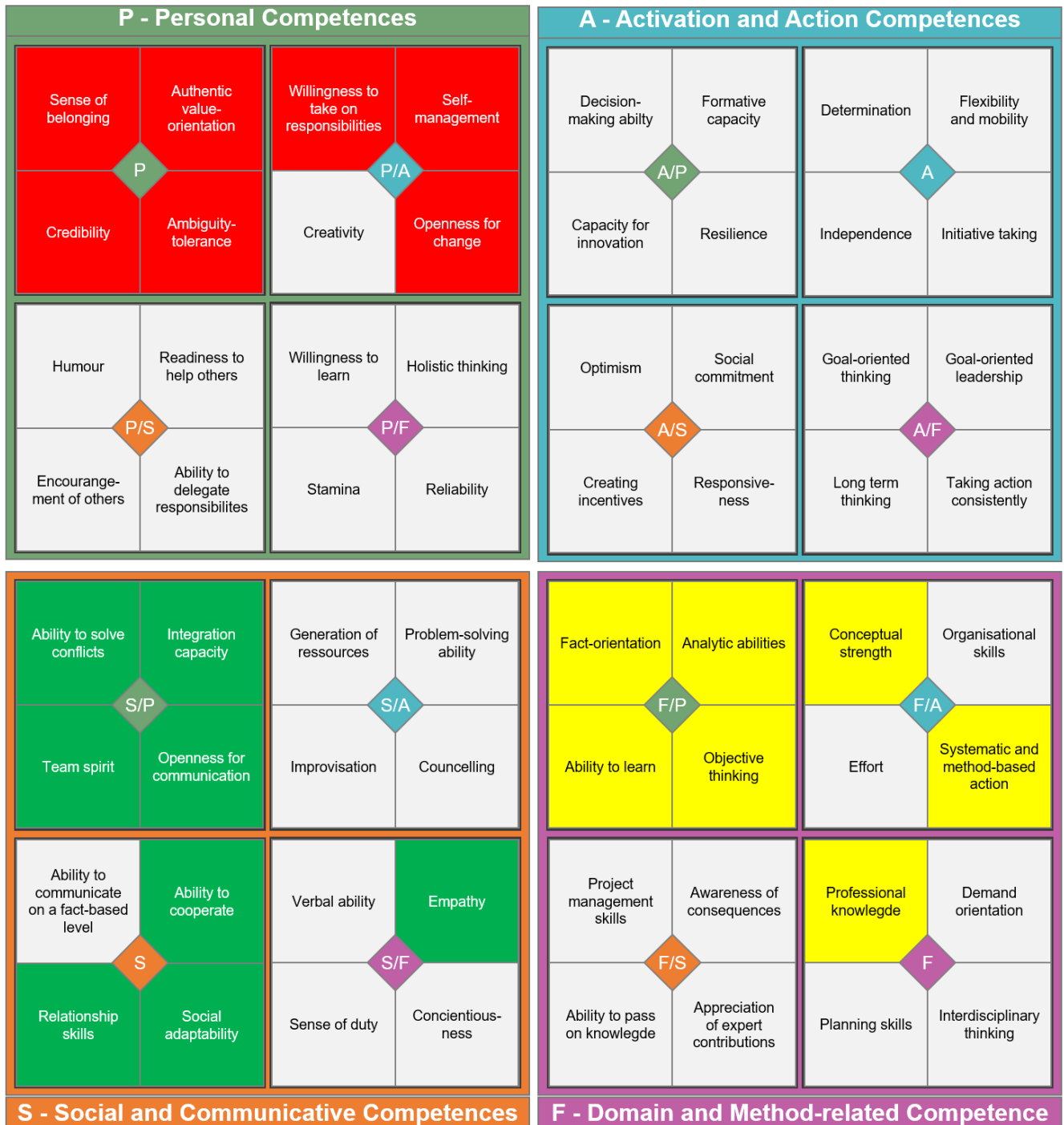


Figure 2: 5P Competence Atlas - Developmental Tasks

The marked competences are central for successfully managing the developmental tasks. This doesn't imply that competences not highlighted in the figure are not important. Their acquisition is primarily either a more general competence (such as organisational skills, verbal ability, or problem-solving ability) or it is specialized (such as planning skills or decision-making activity).

Our competence framework is derived from integrating citizen-driven initiatives and projects on international, national, and regional level in each country. Consequently, categories are created inductively from the goals and objectives set out by those initiatives. These categories can be subordinated to the developmental tasks, and this way integrated into the competence atlas as well.

## **Developing learning for sustainable development with the aid of the 5P competence framework**

Complementary to the framework the partners developed an [online learning programme](#) which consists of seven general modules: introduction to the 5P competence approach, presentation of the competence framework and explanations on how to put it into practice. This is complemented by 5 modules which along with concrete examples demonstrate, how the competence framework can be used for developing adult education for sustainability:

1. environment protection and climate change
2. inclusion and equity in education
3. sustainable management
4. migration and refugees
5. democracy and participation

The following example for the practical application of the 5P Competence Framework relates to the topic of environmental protection and climate change. It explains through the example of a concrete civic initiative to recover the autochthonous forests of the Catalan coastal system as an environmental recovery strategy to mitigate the impact of the climate change and biodiversity loss. The aim is to explain how to use the competence framework to improve informal and non-formal adult learning processes in a course or other learning settings.

### **Mapping the competences**

We recommend educators to start with a brainstorming session on the knowledge, skills and attitudes to be learned in the course or learning event such as

- Understanding and critically analysing the environmental, economic and social impacts of human activities on the forests at local, national and global levels (knowledge).

- Knowledge of sustainable forest conservation strategies, techniques and procedures at local, national and global level.
- Acquire the skills to apply sustainable strategies, techniques and procedures in daily life to protect the local forest.
- The ability to deal with ethical-environmental dilemmas and to reason and justify possible solutions.

In the next step educators are expected look at the 5P-competence framework to identify the competences that best fit the course or other learning setting.

In this example we identify 3 competences in the dimension of *material resources*:

- Competences to handle items of every-day use in a sustainable way
- Competences for recycling, zero waste, and emission management
- Competences necessary to understand the scientific background of ecology

In the dimension of *social values*, we have 2 hits:

- Sense of belonging to the world (Sustainability values)
- Conscientiousness (Awareness)

Last but not least, we have two competences in the dimension of *self-efficacy*:

- Empowerment
- Perseverance



Identifying the competences					
Material Resources	Yes	Social Values	Yes	Self-Efficacy	Yes
Competences to handle items of every-day use in a sustainable way	✓	Sense of belonging to the world (Sustainability values)	✓	Evaluation of one's own sustainable actions (Role distance)	
Competences for recycling, zero waste, and emission management	✓	Conscientiousness (Awareness)	✓	Empowerment	✓
Competences for sustainable nutrition		Inclusion and Participation		Perseverance	✓
Competences necessary to understand the scientific background of ecology	✓	Social adaptability		Cooperation competences (Solidarity)	
Competences to integrate Education for Sustainable Development (ESD) into (local) political activities and entrepreneurial ideas				Organizational competences	
Competence to integrate ESD into teaching and learning activities.					

## Defining the Learning Outcomes

Having provisionally selected the competences, the next step will be to have a closer look at each of the selected singular competences in order to concretise the learning outcomes. The first competence is: **Competences to handle items of every-day use in a sustainable way**. For its adaptation to recovery of the native forest we propose:

<b>Competences to handle items of every-day use in a sustainable way</b>
<p><b>Descriptor</b></p> <p>To manage items that we are using in our every-day-life (such as clothes, paper, water) in a sustainable way means that we take care of their life cycle. This implies being informed about where they are coming from, how they were produced and how they are distributed, or how they can be acquired. As well as treating things carefully, using them in a sustainable way, avoiding waste, and disposing them in a way that fits into a natural life cycle.</p>
<p><b>Knowledge</b></p> <p>Having the necessary information about local and global items and objects used in daily life, their origin, the ecological footprint of their production and transport /distribution. Knowing about options of how to acquire these things and how to use them while considering the lifecycle of the products in use. Knowledge of how to capitalize on local products to avoid the excessive costs of export products.</p> <ul style="list-style-type: none"><li>• knowledge about the different ways of composting tree pruning residues</li><li>• knowledge about the protection of biodiversity in the surrounding forests</li><li>• knowledge about possible environmental changes in the local and global environment</li></ul>
<p><b>Skills</b></p> <p>Being able to use every-day-items properly, parsimoniously, and in an ecological way. Having the necessary skills to consider ecological aspects in using things and to put them into an ecological life cycle.</p> <ul style="list-style-type: none"><li>• Ability to perform forest clearing</li><li>• Capacity on planning and care forest trees at local and global level</li><li>• Ability to carry out tree planting taking into account ecological aspects.</li></ul>
<p><b>Attitude</b></p> <p>Being committed to respecting and incorporating ecological aspects in every-day-life and in objects of daily use.</p> <ul style="list-style-type: none"><li>• Commitment to respect and care for the forests in the local environment</li><li>• Interest in knowing where the trees come from, how they have been produced and how they are distributed for reforestation.</li></ul>

The second competence is: **Competences for recycling, zero waste, and emission management**. For its adaptation to recovery of native forests, the following elements of knowledge, skill and attitudes can be used:

<b>Competences for recycling, zero waste, and emission management</b>
<p><b>Descriptor</b> These competences contain the knowledge necessary for participation in product cycles (e.g. recycling), avoiding waste and an ecological friendly way of handling emissions. The competences are especially related to the motivation for own action and for improving both private and public behaviour.</p>
<p><b>Knowledge</b> Knowledge about the properties of things used in everyday life and options for their ecological use, such as technical procedures of parsimonious heating and necessary tools for this, the ecological footprint of things, procedures of recycling things of daily use or (e.g. buying second hand products), or how to dispose things correct and avoid waste.</p> <ul style="list-style-type: none"> <li>• Knowledge about the negative effects of pollution on the forest</li> <li>• Knowledge of sustainable strategies, techniques and procedures to protect the forest</li> <li>• Knowledge about possible consequences of climate change on the forest</li> <li>• Knowledge about the interrelationship between climate, soil, agriculture, diversity and carbon</li> </ul>
<p><b>Skills</b> Being able to use every-day-items properly, parsimoniously, and in an ecological way. Having the necessary skills to consider ecological aspects in using things and to put them into an ecological life cycle.</p> <ul style="list-style-type: none"> <li>• Skills for combating pollution which negatively affects the forest</li> <li>• Skills to observe possible consequences of environmental changes on the earth's biosphere</li> <li>• Skills on the protection of biodiversity.</li> <li>• Skills on analysing soil</li> </ul>
<p><b>Attitude</b> Being committed to respecting and incorporating ecological aspects in every-day-life and in objects of daily use.</p> <ul style="list-style-type: none"> <li>• Commitment to nature and to biodiversity conservation</li> <li>• Awareness of and participation in nature conservation</li> <li>• Commitment to the recovery of local native habitats</li> </ul>

The last competence in the dimension of material resources is: **Competences necessary to understand the scientific background of ecology**. For its concretisation in learning outcomes we propose:

## **Competences necessary to understand the scientific background of ecology**

### **Descriptor**

To keep up with the current knowledge and techniques supporting sustainable living it is important to address scientific discovery. This is also important to understand interrelations between different aspects of living and of regional differences to come to an own opinion.

### **Knowledge**

Understanding of scientific concepts and terms concerning different aspects of living, their intercorrelation and relevant regional differences; Knowing where and how to access scientific information to solve concrete problems and knowing how to take this as a basis for one's own argumentation.

- Knowledge about analysis and evaluation of the impacts of actions on environmental protection.
- Knowledge about the negative effects of inadequate human actions
- Scientific knowledge about plant ecosystems
- Knowledge about reforestation and sustainable growing techniques
- Knowledge about sustainable growing and forest management methods

### **Skills**

Persons are able to read or to listen to scientific publications and can integrate this knowledge into their own concepts. They can build a critical view on scientific discovery (e.g. being able to distinguish between scientific and non-scientific knowledge) and can draw practical conclusions, own argumentation, and scientifically informed actions from it

- Skills to search for scientific publications
- Ability to reflect on the reliability of scientific studies on plant ecosystems
- Skills of forest reforestation techniques
- Skills in sustainable growing and forest management methods

### **Attitudes**

Persons are interested in scientific discovery, want to stay in-formed thoroughly on specific topics, and take part in discussions on specific topics.

- Commitment to awareness-raising campaigns in defence of the natural environment based on scientific evidences
- Involvement in scientific restoration of protected species

The first competence in the dimension of social values is: **Sense of belonging to the world** (Sustainability values). Its adaptation to recovering of native forest led us to a definition as follows:

<p><b>Sense of belonging to the world (Sustainability values)</b></p>
<p><b>Descriptor</b> Perceiving and understanding oneself as part of the world and the critical reflection on this. Being part of a group is central for the development of values and to act within one's community. This includes the reflection of one's own role as an individual as part of different communities and society as a whole, as well as an understanding of how relationships and groups form and develop. The development of values also includes learning about other persons values, to understand, discuss, and respect these in order to create shared values and applying them as basis for shared sustainable action and visions for a more sustainable future.</p>
<p><b>Knowledge</b> These competences contain knowledge about values and their relevance to persons thinking and behaviour as well as to group dynamics. They also include knowledge about how individual and societal values interrelate with sustainable behaviour and why such behaviour is relevant for the world (e.g. through how climate change impacts different social groups).</p> <ul style="list-style-type: none"> <li>• To know that the values and behaviour of people is very important for the group dynamics in forest maintenance tasks</li> <li>• To know the values of the other people in the group, to understand them, discuss them and create shared values in the actions of forest sustainability</li> </ul>
<p><b>Skills</b> People can communicate with others, build and maintain relationships, develop their own personality as individual and as part of a group and the world. They can reflect on and show empathy for other's values, and debate diverging principles.</p> <ul style="list-style-type: none"> <li>• Ability to value the perspectives and ideas of the group as well as to debate divergent principles regarding reforestation problem solving</li> <li>• Skills in communicating and collaborating with the group of people involved in reforestation</li> <li>• Capacity on solving reforestation problems through team work</li> </ul>
<p><b>Attitudes</b> People are aware of their contributions to a group and their potential impact to their community, they are open for being an active part of a group and take on responsibilities. They are curious and willed to listen to perspectives and ideas of others, including those of minorities. They are aware of the concept of sustainable goals (SDGs) and willing to participate in resolving unsustainable problems like</p> <ul style="list-style-type: none"> <li>• Feeling a sense of belonging to the reforestation group by sharing like-mindedness</li> <li>• Feeling part of the group you cooperate with by sharing ideas and attitudes towards sustainable forest development</li> </ul>

The second and last competence in the dimension of social values is: **Conscientiousness** (Awareness). Its adaptation to recovery of native forest may lead to a definition as follows:

## **Conscientiousness (Awareness)**

### **Descriptor**

Developing a more sustainable way of living requires awareness of current changes in the world that call for more sustainability. Understanding the influence an individual person can have on their community, local politics and direct surroundings can be a key towards implementing sustainable change in one's own everyday life and to start learning necessary skills. This includes the ability to understand one's responsibility for own actions and the state of one's environment and the ability to act accordingly. These competences also include an openness for new information and for learning especially about the interconnected systems in one's direct surrounding and to keep up with new issues and ideas.

### **Knowledge**

These competences contain knowledge about how people, their behaviours and their local or global environment are interconnected. They also include an understanding of one's own perception and how this (in-)forms one's opinion and how to search for and find information.

- Knowledge of how one's actions impacts the nature, especially forest at local and global level
- Knowledge of how the own perception on forest and nature care can influence the opinion of others

### **Skills**

These competences contain skills concerning self-awareness, self-reflection, and self-efficacy. This includes the critical reflection of own perceptions and concepts, the search for and differentiation of trustworthy from unreliable information and the critical integration of new information into one's own concepts.

- Skills to mobilize the citizenship in favour of the protection of the local and global (forest) ecosystem
- Ability to reflect on the reliability of the own perception and opinion on nature and forest protection and reforestation

### **Attitudes**

Persons are open for taking responsibility for challenging tasks, are willed to face inconvenient truths and to both learning or teaching new things. They pay attention to their environment and other people and seek exchange and new information.

- Develop a sense of responsibility for the protection of the planet's ecosystems and a clean environment
- To be aware of the importance of protecting and respecting the existing vegetation in each place

The first competence in the dimension of self-efficacy is: **Empowerment**. Its adaptation to recovering of native forest can be defined as follows:

<b>Empowerment</b>
<b>Descriptor</b> Empowerment means to encourage people to take charge of their lives and to be active citizens. With regards to sustainable action this can happen through the integration of Sustainable Development Goals into the personal social network (at work, personal networks, local community among others). It is important to show enthusiasm and commitment to one's values and by this one can in-spire others to get engaged for sustainable development as well.
<b>Knowledge</b> Knowledge about own resources and about how oneself and other people can be motivated for taking up actions and how to sustain both motivation and action. Knowledge about Social Development Goals and possibilities of their implementation into daily live. Knowledge about how knowledge can be shared. <ul style="list-style-type: none"><li>• Knowledge on how to promote social awareness of nature conservation through the media and/or information campaigns.</li><li>• Knowledge of the work of scientific entities and associations related to nature, in order to share data and exchange experiences, strengthening work and communication networks.</li></ul>
<b>Skills</b> If someone is an empowering person, they can excite others to engage in a topic, to change their behaviour, and/or to participate in movements concerning sustainable development. It includes reflecting on and increasing self-determination. <ul style="list-style-type: none"><li>• Skills on strategies aiming at changing from "awareness" to "active engagement" that will strengthen the own capacities to participate in caring the forest.</li><li>• Capacity to persuade other persons from the personal environment to participate in caring the forests and for nature in general.</li><li>• Being able to analyses the situation, to study possible options, to reflect on one's own capacity to act in preventing impact on nature: forest locally and globally.</li></ul>
<b>Attitudes</b> An empowering person must have self-determination, social interest and willingness for engagement with relevant topics and self-development. This can also include persuasive skills and empathy. <ul style="list-style-type: none"><li>• Determination to be informed, to broaden and to deepen their knowledge and skills on caring nature/forest locally and globally.</li></ul>

The last competence in the dimension of self-efficacy is: **Perseverance**. Its adaptation to recovering of native forest conduce to define as follows:

<p><b>Perseverance</b></p>
<p><b>Descriptor</b> Perseverance can be understood as an important element of self-management. It is a competence to motivate oneself to continue with one's activities and to take over responsibility for the actions undertaken by oneself and from others.</p>
<p><b>Knowledge</b> Understanding on psychological barriers of perseverance and how to address them.</p> <ul style="list-style-type: none"> <li>• Knowledge of methods to overcome mental barriers and achieve objectives related to caring forest.</li> <li>• Knowledge on how to develop concentration, motivation, and effort to achieve your short and long term goals.</li> </ul>
<p><b>Skills</b> Patience and endurance. Leadership. Competence of being active and holding on in doing one's own things. Taking over responsibility. Carry others along and working together over a long time.</p> <ul style="list-style-type: none"> <li>• Ability to deal with ethical-environmental dilemmas and to reason and justify possible solutions for caring the forests.</li> <li>• Ability to promote the integration and participation of persons from the personal environment in caring the forests locally and globally.</li> </ul>
<p><b>Attitudes</b> People are not only used to take strong efforts to reach their goals, but they also continue their efforts after having failed. They are strongly convinced that patience and endurance are important to reach their goals and that they will be successful.</p> <ul style="list-style-type: none"> <li>• Persevere to achieve one's own objectives, despite the obstacles, difficulties, failures and frustrations you encounter along the way.</li> <li>• Don't give up on what you want just because it is difficult, complex or will take time to achieve it.</li> </ul>



Based on the definition of the competences to be acquired by the end of the course, the type of the course is selected: online learning blended learning or face-to-face learning. For this course, face-to-face learning seems to be the best option.

Also the learning approach should be defined as e.g. social learning model, problem based learning, challenge based learning etc.

**The course can include several types of activities as**

- Carrying out, developing and disseminating citizen science activities cataloguing trees and other fauna and monitoring and study of forest populations, behaviour and functioning of forest ecosystems.
- Study of plant communities and the phenomenon of ecological succession - Reforestation and promotion of floral and faunal diversity in the local environment.
- Reforestation and promotion of floral and faunal diversity in the local environment.
- Promoting reforestation of forests to reduce the destruction of the ozone layer and the greenhouse effect.
- Conservation of forest masses to promote soil fertilisation and prevent soil erosion.
- Promotion, dissemination and enhancement of knowledge of the natural environment, promoting social awareness of nature conservation through the media and/or information campaigns.
- Promoting environmental awareness and the cleaning of forest ecosystems from human impact.
- Recovering the ties that bind us to ecosystems through the study and valuation of forests as an educational tool.

## Examples of Workshops

On the next pages we present three examples of workshops that can be carried out:

The first one is about planting in winter and maintenance from spring to autumn, with the objective to introduce to the plantation method Labyrinth, a reforestation technique of planifolian forests, based on the specific case of the phenomenon of ecological succession from barren fields to riparian forests in the coastal plains. This technique has a higher success rate than open-country plantations in restoring these degraded forest communities with saving in environmental and economic cost.

<b>PLANTATION AND MAINTENANCE WORKSHOP</b>			
<b>Seasons:</b> Planting in winter / Maintenance from spring to autumn			
<b>Activity</b>	<b>Description</b>	<b>Target duration</b>	<b>Objective</b>
Maze aperture (September to January)	Manual pruning of walkways and bramble hedges	3 hours	Initiation to the Plantation method Labyrinth, a reforestation technique of planifolian forests, based on the specific case of the phenomenon of ecological succession from barren fields to riparian forests in the coastal plains. This technique has a higher success rate than open-country plantations in restoring these degraded forest communities with saving in environmental and economic cost.

The second is an environmental education workshop focused on forest. Its objective is to introduce acorn sowing; the plantation method Labyrinth, recovery of forest at gradient river slopes, forest management and fire prevention, and at least to the post-fire forest management.

<b>ENVIRONMENTAL EDUCATION SESSION AGENDA</b>	
<b>TITLE OF DE SESSION</b>	<b>OBJECTIVES AND VALUES TO BE DISCLOSED</b>
The sowing of acorns	<p>Analysis of Iberian quercetum, natural and historical heritage. Study of the phenomenon of ecological succession of the secondary shrubby machia (e.g., a Mediterranean machia such as Querceto-lentiscetum) to mature forests (corkades, oaks, beans..)</p> <p>Study of the role of wildlife in the dispersion and storage of Quercus acorns</p> <p>Mother tree selection techniques, belligerent harvesting and direct sowing to secondary machia.</p>
The plantation in Labyrinth	<p>Analysis of the conservation status of Iberian riparian forests. Study of the phenomenon of ecological occurrence of secondary barges (Rubus) case in mature riparian deciduous forests. Plantation technique in Labyrinth.</p>
Restoration of gradient river slopes	<p>Analysis of the conservation status of Iberian riparian forests</p> <p>Description of the riparian forest quality index</p> <p>Comparative study between natural, semi-natural and artificial riverbanks</p> <p>Method of restoring riparian vegetation to prevent flood damage or erosion of fertile soil.</p>
Forest management and fire prevention	<p>Analysis of the impact of commercial forest management on the environment in the short and long term</p> <p>Developing sustainable forestry management methods based on the study of ecological success and the conservation of biodiversity.</p>
Post-fire forest management	<p>Impact analysis of post-fire actions</p> <p>Development of sustainable methodology for restoring natural habitats after a fire</p>

The third example is not a fictive one, it's an online course which already takes part in Germany, and which is part of the "global field – 2000m<sup>2</sup>" project. It's about soil and the storage of carbon and to learn about the interrelationship between climate, soil, agriculture and diversity. Thinking of the other examples above, this one can be further developed in the direction of forest/reforestation and analysing forest soil.

<b>A journey into the soil of the global field</b>			
online workshop			
<b>Activity</b>	<b>Description</b>	<b>Target duration</b>	<b>Objective</b>
Input	Information about soil and CO <sub>2</sub> and the interrelationships.	1 hour	Learn about soil CO <sub>2</sub> storage and carbon: the substance, what makes it up, where does it come from, where does it go and what it has to do with the soil.
Practical experience – analyzing soil	Digging in humus (you have to bring a soil sample, from the garden, the park e. g.) and learn how to analyze the soil.	1 hour	Learn about the interrelationships between climate, soil, agriculture and diversity.

Link to workshop (in German):

<https://www.2000m2.eu/de/klima-boden-seminar/>



## References

- Bilger, F., Gnahn, D., Hartmann, J. & Kuper, H. (Hrsg.) (2013): Weiterbildungsverhalten in Deutschland. Bielefeld: Bertelsmann.
- Bronfenbrenner, U. (1981): Die Ökologie der menschlichen Entwicklung. Stuttgart: Klett-Cotta.
- Delors, J. (1996): Learning: the treasure within. Paris: UNESCO.
- EU-Commission / Eurostat (2016): Classification of learning activities - Manual. (<https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-15-011>)
- EU-Commission (2022): GreenComp: The European sustainability competence framework. (<https://publications.jrc.ec.europa.eu/repository/handle/JRC128040>).
- Eurostat (2016): Classification of Learning activities – Manual. Luxembourg: Publications Office of the EU.
- Havighurst, R. (1972): Developmental Tasks and Education. Boston: Addison-Wesley.
- Hericks, U. (2009): Entwicklungsaufgaben in der Berufseingangsphase. In: Journal für LehrerInnenbildung 9. p. 32-39.
- Heyse, V. & Erpenbeck, J. (2004): Kompetenztraining. Stuttgart: Schäffer-Poeschel.
- Heyse, V. & Erpenbeck, J. (2017): Der KODE® Kompetenzatlas. <https://www.kodekonzept.com/wissensressourcen/kode-kompetenzatlas/>
- Hurrelmann, U. (1998) (Ed.). Handbuch der Sozialisationsforschung. Weinheim und Basel, Beltz Verlag.
- Klieme, E. & Hartig, J. (2007): Kompetenzkonzepte in den Sozialwissenschaften und im erziehungswissenschaftlichen Diskurs. In: Prenzel, M., Gogolin, I. & Krüger, H.-H. (Ed.): Kompetenzdiagnostik. Wiesbaden: VS Verlag für Sozialwissenschaften. p. 11 - 29.
- Kuper, H. & Kaufmann, K. (2010): Beteiligung an informellem Lernen. In Zeitschrift für Erziehungswissenschaft, 13, S. 99-119.
- Meigel, J. (2022): Kompetenzprofile von Trainern in der Sportart Tennis. Inaugural Dissertation, LMU München.
- Rieckmann, M. & Barth, M. (2022): Educators' Competence Frameworks in Education for Sustainable Development. In: Vare, P.; Lousselet, N. & Rieckmann, M. (Ed.): Competences in Education for Sustainable Development. Berlin: Springer. p. 19-26.
- Rohs, M. (2016): Begriffsgeschichte informellen Lernens. In: Rohs, M. (Hrsg.): Handbuch informelles Lernen. Wiesbaden: Springer, S. 1-30

- Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday/Currency
- UNESCO (2014): UNESCO Roadmap for implementing the global action programme on education for sustainable development. (<http://unesdoc.unesco.org/images/0023/002305/230514e.pdf>).
- UNESCO (2017): Education for Sustainable Development Goals. Learning Objectives. ([https://www.unesco.de/sites/default/files/2018-08/unesco\\_education\\_for\\_sustainable\\_development\\_goals.pdf](https://www.unesco.de/sites/default/files/2018-08/unesco_education_for_sustainable_development_goals.pdf))
- UNESCO (2020): Education for sustainable development. A roadmap. <https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en>
- Wals, A. & Mochizuki, Y. (2017): Critical-case-studies of non-formal and community learning for sustainable development. In: *International Review of Education*. DOI 10.1007/s11159-017-9691-9.
- Weinert, F. (2002): Vergleichende Leistungsmessung in Schulen – eine umstrittene Selbstverständlichkeit, in: Weinert, F. (Ed.): *Leistungsmessungen in Schulen*, Weinheim, Basel: Beltz, p. 17 – 31.

