



## D3.1

# Participatory will-formation by crowdsourcing

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## WHO WE ARE

The ECF consortium consists of ten partners. The project is coordinated by the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas-CIEMAT.

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## ABOUT THE PROJECT

Through a multidisciplinary, transdisciplinary and participatory process, ECF4CLIM develops, tests and validates a European Competence Framework (ECF) for transformational change, which will empower the educational community to take action against climate change and towards sustainable development.

Applying a novel hybrid participatory approach, rooted in participatory action research and citizen science, ECF4CLIM co-designs the ECF in selected schools and universities, by: 1) elaborating an initial ECF, supported by crowdsourcing of ideas and analysis of existing ECFs; 2) establishing the baseline of individual and collective competences, as well as environmental performance indicators; 3) implementing practical, replicable and context adapted technical, behavioural, and organisational interventions that foster the acquisition of competences; 4) evaluating the ability of the interventions to strengthen sustainability competences and environmental performance; and 5) validating the ECF.

The proposed ECF is unique in that it encompasses the interacting STEM (Science, Technology, Engineering, and Mathematics) -related, digital and social competences, and systematically explores individual, organisational and institutional factors that enable or constrain the desired change. The novel hybrid participatory approach provides the broad educational community with an ECF adaptable to a range of settings; new ways of collaboration between public, private and third-sector bodies; and innovative organisational models of engagement and action for sustainability (Sustainability Competence Teams and Committees).

To encourage learning-by-doing, several novel tools will be co-designed with and made available to citizens, including a digital platform for crowdsourcing, the Internet of Things (IoT) solutions for real-time monitoring of selected parameters, and a digital learning space. Participation of various SMEs in the consortium maximises the possibilities for a broad adoption and applicability of the ECF for the required transformational change towards sustainability.



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## 1 EXECUTIVE SUMMARY

One of the key objectives of the ECF4CLIM project is to develop, test and validate a European framework for sustainability through a novel hybrid participatory approach, rooted in participatory action research and citizen science. In practice, this was achieved through participatory crowdsourcing, implemented in the Task 3.1 (Work Package 3). Task 3.1 comprised crowdsourcing exercise, which solicit civic opinion on how to operationalise the individual and collective competences to prevent climate change and to promote sustainable development, as well as on the factors that enable or constrain their adoption and transmission in education. The aim of the crowdsourcing process was to engender a collective meaning-making process, in terms of education for sustainability, by engaging a large, international group of students, parents, teachers, principals and experts in education in discussions on how to develop sustainability education. Specific endeavours were made to organise workshops and invite people from underrepresented communities and otherwise marginalized positions in the societies, such as students from disadvantaged socioeconomic backgrounds, socially vulnerable young adults and young people from indigenous communities.

The crowdsourcing exercise included two practices: First, the Method of Empathy-Based Stories (*MEBS*; Wallin, Koro-Ljungberg & Eskola 2019) was applied in crowdsourcing workshops to stimulate rich discussions on the participants' experiences on the enablers and constraints of sustainability education. The workshops were tailored to the needs of different participant groups. Second, an online discussion for international audiences was facilitated on the eDelphi platform to obtain a deeper understanding of the issues addressed in the crowdsourcing workshops.

The data generated in the workshops includes 1) post-it notes and notes on an online Flinga platform written by the participants during the workshops, 2) facilitators' notes on the presentations of the small group discussions and reflective remarks at the end of the workshops, and 3) the national and international stakeholder discussions on the eDelphi platform. The findings presented in this report derive from both inductive and deductive qualitative analysis.

Even though the focus of discussions varied among the participants of different partner countries, the following issues were generally regarded as essential in advancing sustainability competences in education: awareness raising, sufficient human and material resources, adequate infrastructure, effective management with visions and concrete strategies, cross-curricular and interdisciplinary education with designed continuity including meaningful learning and integration of theory and practice.

Relations with the society and the surrounding community are also relevant for the promotion of sustainability education.

Participatory approaches were regarded as the key in engaging people in promoting sustainability, and different participatory methods were also discussed on eDelphi. Governing, creating collective cultures of action, materials and models for change, as well as developing pedagogical practices of learning in practice were regarded as essential concrete steps forward in developing sustainability education among the participants on eDelphi.

The differences between countries were manifested in the eDelphi discussions. Awareness campaigns were seen as highly relevant among the participants from southern European countries. The national strategies and structures were much discussed among the Finnish participants. The Finnish participants regarded national regulations and strategies as major positive enabler, while the participants of other countries raised critical thought about hierarchies. This may be related to the fact that in Finnish society, citizens' trust in the administration is one of the highest in the world, and Finland is the one of the least corrupted countries in the world (Transparency International 2021). People trust that the authorities will work for the common good, and because of this they are ready to accept measures imposed by the state in terms of environmental protection as well.

Valuing sustainability and action for sustainability were regarded as the most important sustainability competences and areas. Besides the ability to communicate and training skills, critical and systems thinking were mentioned in different crowdsourcing practices.

The findings indicate that environmental performance and the individual and collective competences defined in GreenComp, the European Sustainability Competence Framework, are essential in promoting sustainability in various educational contexts. Thus, GreenComp seems to serve as a reasonable springboard for operationalizing sustainability competences.

## 2 OBJECTIVES

The participatory will-formation through crowdsourcing (Task 3.1) engaged a large, international group of students, parents, teachers, principals, experts in education, and underrepresented communities in deliberative discussions and will-formation process about promoting sustainability in education. The aim was to find the factors that enable or constrain the adoption and transmission of sustainability competences in different contexts and levels of education. This served as a means of collectively operationalising

and giving more concreteness to the individual and collective competences defined in the European Framework of Sustainability Competences *GreenComp* (Bianchi & al. 2022). Particular efforts were made to solicit the opinion and experiences of underrepresented communities: people from such as a school with students from and young adults with disadvantaged socioeconomic backgrounds and members of an indigenous community (Sámi in Finland) who often suffer disproportionately from climate change and environmental risks. Besides the workshops, an online discussion for international audiences was facilitated on eDelphi platform to deepen the understanding of the issues evolved in the crowdsourcing workshops.

Together with the literature and policy review conducted in Task 3.2, the crowdsourcing process of the Task 3.1 fosters the understanding of what kind of needs, participatory tools, and interventions would be most suitable for different contexts and what kind of issues the educational stakeholders find most relevant. Thus, these tasks 3.1 and 3.2 form a basis for the development of the first draft of the operationalised European competence framework for climate change and sustainability (Task 3.3).

### 3 CONCEPTUAL FRAMEWORK AND METHODOLOGY

In this chapter the conceptual framework used in this report and the methodology applied in crowdsourcing practice and in the ECF4CLIM project are defined. The chapter begins with section 3.1 that introduces the key concepts of the ECF4CLIM project that are used in this crowdsourcing report. Section 3.2 describes the method used and the analyses of the data gained in the workshops, whereas section 3.3 explains the discussion practice on eDelphi. Finally, section 3.4 reflects upon the challenges encountered in crowdsourcing and inviting people to participate.

#### 3.1 Conceptual framework

The methodologies in the ECF4CLIM project are rooted in the traditions of participatory action research (Kemmis et al. 2015), practitioner research (Heikkinen, deJong & Vanderlinde 2016) and citizen science (Senabre, Perelló, Becker, Bonhoure, Legris & Cigarini 2021). Crowdsourcing is an essential part of citizen science, which in turn is based on the basic assumptions of deliberative democracy: to be legitimate, the norms and practices in society should be addressed in a genuinely open and inclusive discussion (authentic deliberation), not merely the aggregation of preferences that occurs in voting (Herzog & Lepenies, 2022).

### **Crowdsourcing**

Crowdsourcing means engendering a collective deliberative meaning-making process among relevant stakeholders (Aitamurto & Chen, 2017). In practice, crowdsourcing is typically organized on an internet platform where information is obtained by enlisting the services of a large number of people (Brabham 2013). In the crowdsourcing practice of ECF4CLIM large groups of people, different stakeholders, including students, parents, teachers, and experts in education were invited to discuss on the enablers and constraints of sustainability in education.

### **Sustainability competence**

Sustainability competences are “the interlinked set of knowledge, skills, attitudes, and values that enable effective, embodied action in the world with respect to real-world sustainability problems, challenges, and opportunities, according to the context” (Bianchi et al. 2020, 2). In this project, the European Sustainability Competence Framework is applied and further developed, according to which there are several competence areas that can be both individual and/or collective in nature.

### **Individual competences**

The individual competences refer to the “development of a combination of personal qualities and (possibly) qualifications” (Vare 2022), knowledge, skills and attitudes that are needed to achieve certain goals through his/her actions and activities, in this case to promote a more sustainable way of life.

### **Collective competences**

We define collective competences as organizations’ abilities as “an innate quality or potential that lies within a given organism, institution or system” (Vare 2022). Collective competences thus refer to the organisations’ ability to take action on a given issue. These competences have different dimensions: one the one hand, they may refer to obligation - and freedom - given for the organisation by an external authority, like the state, to act upon a given issue. On the other hand, they may refer to the organisation’s internal capacity to determine what action it want to take, and how. In the ECF4CLIM project, the working definition of collective competences draws from Scott’s (2013, 60) work on institutions, and thus ECF4CLIM categorises collective competences as regulative, normative or cultural-cognitive cognitive competences. ECF4CLIM aims to identify and foster collective competences for educational institutions, such as national school curricula that condition the ways in which sustainability is integrated into teaching in the different disciplines (regulative competences); and the internal strategic and operationalised approach to act sustainably at organisational level (normative competences). The collective competences may include also pedagogical skills, training,

adequate facilities, and an appropriate learning. Collective competences manifest also as operative culture, collective atmosphere including social norms and attitudes (cultural-cognitive competences).

### **Environmental performance**

Environmental performance refers to the verifiable performance of a society to manage its impact to the environment. To operationalize the evaluation of the environmental performance, the ECF4CLIM project uses environmental performance indicators such as resource, energy, and water consumption, emissions, indoor air quality, transport, green procurement, green spaces, indoor air quality, and waste management. The environmental impacts, and the energy efficiency calculations in buildings at the selected demonstrations sites will be assessed as their environmental performance.

### **European Sustainability Competence Framework, GreenComp**

The European Sustainability Competence Framework, *GreenComp* (Bianchi & al. 2022), identifies a set of sustainability competences designed to feed into education programmes to help learners develop knowledge, skills and attitudes that promote ways to think, plan and act with empathy, responsibility, and care for our planet and for public health. It comprises four interrelated competence areas, each further divided into three interlinked and equally important competences.

*Table 1. Competence areas and competences in the European sustainability framework GreenComp*

Competence areas	Competences
Embodying sustainability values	Valuing sustainability Supporting fairness Promoting nature
Embracing complexity in sustainability	Systems thinking Critical thinking Problem framing
Envisioning sustainable futures	Futures literacy Adaptability Exploratory thinking
Acting for sustainability	Political agency Collective action Individual initiative

### 3.2 Crowdsourcing process

The crowdsourcing exercise utilised different data collection tools to enable various kinds of communities to have their voice heard in the process. These included two types of activities. First, a set of national online or face-to-face workshops were organised in partner countries to enable teachers, students, education experts, and various stakeholders to reflect what prevents and/or enables schools to implement sustainability education. Second, the eDelphi online platform was used to facilitate both national and international discussions. The whole crowdsourcing process is illustrated in Figure 1.

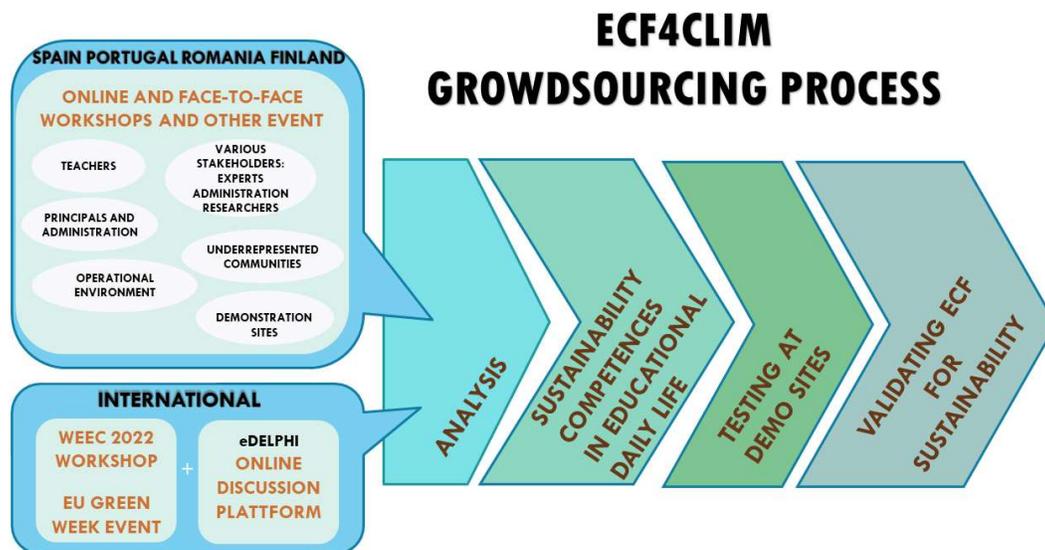


Figure 1. Crowdsourcing process in ECF4CLIM-project

The crowdsourcing practices aim to identify and understand the types of competences that are essential in promotion of sustainability in daily life of various educational contexts. This understanding generated in crowdsourcing process together with the literature and policy review completed in Task 3.2 form a basis for the development of the first draft of the operationalised European Competence Framework (ECF) for climate change and sustainability (Task 3.3) that will be tested during the intervention process at demonstration sites and defined at the end of the whole ECF4CLIM project.

### 3.3 Crowdsourcing workshops

National and international online and face-to-face workshops were organized in partner countries to collect the ideas and experiences of the educational stakeholders on the factors constraining and enabling promotion of ecological sustainability and sustainability competences in various educational institutions and contexts.

#### *Invitations and participants of the workshops*

The partner countries with demonstration sites (Finland, Spain, Portugal and Romania) organised workshops for their demonstration sites. In addition, educational stakeholders were invited to the workshops either through personal invitations or through open call within newsletters and/ or social media (Romania and Finland). In Finland, five workshops and a seminar were organised together with the Finnish National Agency for Education.

All national and international crowdsourcing workshops carried out in the partner countries (organized between 31<sup>st</sup> January and 2<sup>nd</sup> June) are listed in the following table. More detailed information can be found in the Appendix 1.

*Table 2. Crowdsourcing workshops and seminars spring 2022*

Country	Number of workshops	Number of participants	Participated groups
Spain	6	114	Students, teachers, principals, other school/ university staff, policymakers, environmental and sustainability educators, other stakeholders
Portugal	3	45	Students, teachers, researchers, stakeholders
Romania	6	80	Students, teachers, other school staff, stakeholders
Finland	14	238	Students, teachers, principals, other school staff, socially vulnerable young adults, Sámi indigenous people, researchers, environmental and sustainability educators, governmental officers, other stakeholders
International	2	23	University teachers, researchers
<b>ALL TOGETHER</b>	<b>31</b>	<b>500</b>	

#### *The Method of Empathy-Based Stories*

Most of the workshops applied The Method of Empathy-Based Stories (*MEBS*; Wallin, Koro-Ljungberg & Eskola 2019) as a data acquisition method. This method was chosen to collect critical insights on the constraints for sustainability education and to inspire creative thinking and visioning sustainable schools based on the participants' experiences.

The participants were asked to imagine, based on their real-life experiences, two fictional stories about a day at a ‘nightmare school’ and a ‘dream school’, in which sustainability education would be realized in the worst possible and the best possible way, respectively.

The reflection on the characteristics of a sustainable school was guided by two opposing imaginary examples. First, participants were asked to imagine what happens in a ‘nightmare school’ where everything goes wrong in terms of sustainability education. Why does the school fail in sustainability education? What do teachers and students, the principal, other school staff, and parents do and why? How do the school owner and the surrounding community and society disable sustainability education?

In the second phase, the participants were asked to imagine what happens in a ‘dream school’ where everything goes well in terms of sustainability education. Why does the school succeed in sustainability education? What do teachers and students, the principal, other school staff, and parents do and why? How do the school owner and the surrounding community and society enable their work for sustainability education?

Although participants in all countries were given the same instructions translated into national languages, implementation was slightly different in different countries. The workshops facilitated in Romania and Portugal focused mainly on defining the nightmare and dreams schools in terms of the school’s environmental performance and quality of the infrastructure. Little attention was paid to education in schools. Nevertheless, also the issues constraining and enabling the promotion of sustainability competences in schools and universities were discussed at the end of the workshops. In addition, the design of the workshop for a group of socially vulnerable young adults was adjusted by leaving space for a more open discussion without the guidance of specific questions. A collective narrative of a sustainable future was instead created with the young adult participants on the basis of their ideas and initiatives.

### ***Instructions for partners and the Flinga crowdsourcing platform***

In January 2022, a workshop plan was designed and revised after the comments given by the partners and participants of a pilot workshops. The pilot workshop had focused more on the current and lacking tools in sustainability education. JYU presented the final workshop design and the Flinga platform to be applied in the crowdsourcing workshops organized nationally by the partners. A slide show with instructions in national languages was then also delivered. The Flinga platform was chosen for the online workshops, as the University of Jyväskylä had positive user experience and a license with extensive user rights for the platform ([edu.flinga.fi](http://edu.flinga.fi)). Flinga is publicly accessible for free, and therefore it is available for the partners and other stakeholders also afterwards, ([flinga.fi](http://flinga.fi)), albeit with somewhat more limited user rights.

### *The data collected*

After each workshop, the partners provided summary notes of the themes discussed and the reflections brought up by the participants during the workshops. Additionally, the data includes all the notes written by the participants, altogether 1747 notes. In the workshops organized in Finland also the discussions and presentations of the themes discussed, and the concluding reflections were recorded.



*Figure 2. Post-it notes on paper and on Flinga*

### *Analysis*

The workshop data were analysed both inductively and deductively. The process of inductive analysis included the following phases: listening to the recorded data, writing notes and summaries, and conducting a content analysis focused on the themes of the presentations and on the discussions. The inductive analysis generated an overview of the issues that constrain or enable sustainability education. The inductive analysis was followed by and complemented later with a deductive analysis.

The deductive analysis was based on the GreenComp Sustainability Competence Framework, the individual and collective competences tentatively identified within WP3, and environmental performance – that is, on the main dimensions of ECF4CLIM. Deductive analysis of one part of the notes written on the post-its and Flinga have already been conducted and coded on the Atlas.ti program. The findings presented in chapter 4 are based on the early findings from the inductive and deductive analyses.

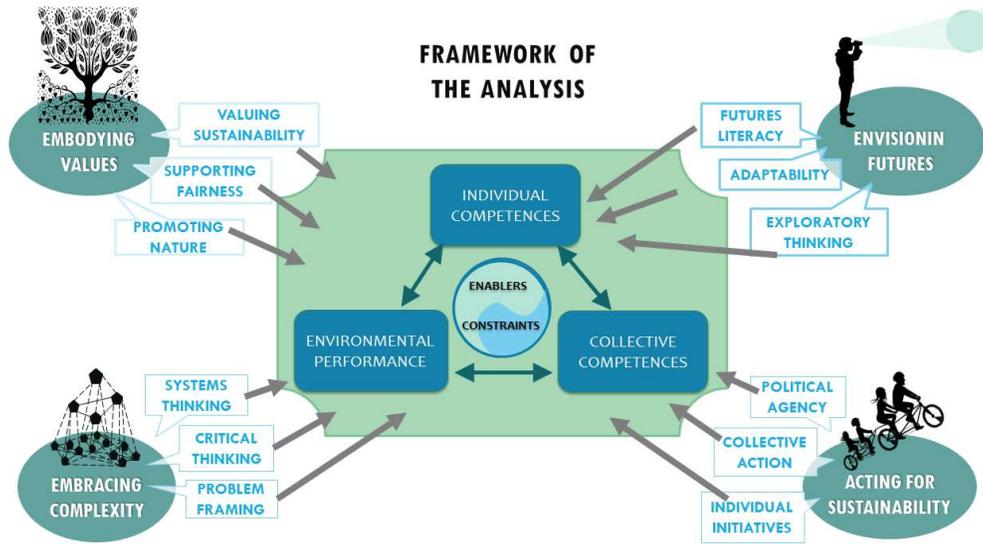


Figure 3. Framework for the analysis

### 3.4 Online discussion on sustainability competences

The online discussion on the eDelphi platform (<https://www.edelphi.org/>) was designed to obtain a deeper understanding of the issues emerging from the workshops. The discussion platform was opened on the 25<sup>th</sup> of April 2022, immediately after the finalization of the most workshops. The discussions are available in multiple languages and will continue until the end of the 2022, even though the this deliverable will report on the discussions only until June 2022.

#### *eDelphi platform*

The eDelphi (<https://www.edelphi.org/>) was chosen for the online discussions as it enables ongoing and evolving discussions, adding new questions during the conversation and reinviting participants to the discussions. eDelphi also makes it possible to group the participants according to the stakeholder group they represent, which is helpful in analysing the data. Given that eDelphi is an open-source program, and limited version can be used free of charge; this tool is available to partners, demonstration sites, and stakeholders also after the data collection has ended. The eDelphi platform follows the requirements of the General Data Protection Regulation (GDPR) of EU. This platform was also carefully reviewed and approved for data protection issues by the University of Jyväskylä's data protection services.

### *Invitations to the discussion*

The eDelphi discussion was facilitated by the University of Jyväskylä (JYU). All partners were asked to send email lists of the potential workshop participants, personnel of the demonstration sites and other relevant stakeholders to be invited to the discussion process on eDelphi. Altogether 470 people were invited to participate. Through open invitations the participants could register onto the platform and the discussion could be reached from address <https://www.edelphi.org/ecf4clim>. The open invitations were sent through networks, mailing lists, and social media.

### *Discussion via eDelphi*

The eDelphi discussion process comprised four phases that introduced new questions at one-to-two-week intervals. The discussion focused on the following questions:

- 1) What are the best ways to engage schools/universities and individuals to take action towards sustainability?
- 2) Which areas of GreenComp have you already promoted in your work and how? Is something essential missing from GreenComp?
- 3) What concrete steps are needed to move towards a sustainable school and education? Who will lead the change, and how?
- 4) In your opinion, what is the most important sustainability competence/content to learn and why?

These questions derived from the themes that had been brought up by the participants in the workshops. Some phases of the discussion included also specific questions asking the participants to evaluate the most relevant themes by choosing from given options. The discussions were facilitated in the national language. All questions were translated into English, Spanish, Portuguese, Romanian, and Finnish, with a specific tab /discussion area for each language. Hence, the participants could also participate and follow the discussions in different languages by using e.g. Google Translate.



*Figure 4. Invitation to eDelphi in Facebook*

### The data collected

The data from the eDelphi platform can be downloaded as .xlsx or .pdf files and graphics can be loaded separately. The background information of the participant groups is not included in these files, but it is possible to download background data group by group, so this information is available for the analysis. The background data of the participants who registered onto the eDelphi platform at their own initiative is not available.

By 29 June 2022, 119 people had signed the consent form on the first page of the platform, and 68 participants had written answers to open questions (Spain 19, Portugal 4, Romania 16, and Finland 29 participants). In addition to this, some answered only the two multiple-choice/rating scale questions. The process resulted in 50 pages (about 13 800 words) of discussions. This data complements the data collected from the workshops. Compared to the data produced in the workshops, the answers on eDelphi are longer, and not shaped by the facilitation.

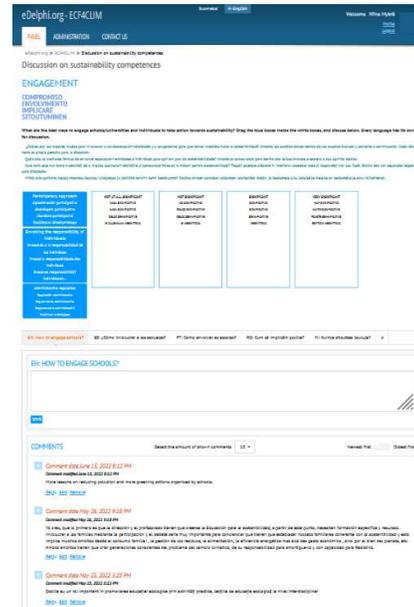


Figure 5. One page of eDelphi discussion

### Analysis

The themes discussed on eDelphi were analysed inductively, categorised, and coded by using the Atlas.ti software. Quantitative data in the form of graphics is available on the two multiple choice/rating scale questions.

## 3.5 Challenges in crowdsourcing

Crowdsourcing is an essential part of citizen science, aimed at acquiring grassroots knowledge and enabling a wide range of publics and relevant stakeholders to get their voices heard. However, it is often difficult to get people to participate. In an ideal world, versatile groups of people would seek for possibilities to influence the debate and share their ideas and experiences. In the real world, people are busy, and are not easily persuaded to invest their scarce time in this type of discussions. Several challenges were faced while inviting people to the crowdsourcing practices.

Attracting participants to the stakeholder workshops was difficult. Calls for participation were sent to a large audience, but some workshops were cancelled due to the lack of participants. Not all those who registered to the workshops showed up.

For example, in Romania, some workshops for stakeholders were advertised on the Facebook page CRED, the network of teachers in Romania with more than 30 000 members. However, only 30 persons registered to the workshop, and only nine participated actively. In Romania the problem is the lack of participation due to insufficient trust in such public debates. In Finland, a student workshop at the University of Jyväskylä and a Sámi workshop were widely advertised, but only four students and four Sámi people attended the workshops. In addition, the workshops for the maintenance staff of schools got only 8 participants, even if the workshops were advertised through multiple channels. Also, vulnerable groups were hard to reach. Despite these challenges, the crowdsourcing workshops can be considered successful, given that they reached a broad spectrum of participants and generated a lot of positive feedback.

For the international eDelphi discussions, 470 individuals were invited, but not more than 79 participated actively in the discussions. The number also includes those who had responded to the open invitations. Some of the participants answered in a very brief manner to only one question, or only to the multiple-choice questions. Commenting of the answers given by other participants was scarce. However, valuable and relevant viewpoints were brought up in the discussions.

The number of the workshops and participants in both types of crowdsourcing practices varied across the partner countries. The workshop method and its focus were applied differently in partner countries, potentially influencing the workshop results. Nevertheless, the results from eDelphi discussions were not influenced by differences in facilitation in the different partner countries.

Despite all the challenges, the result of crowdsourcing process was satisfying. Considering the constraints, the data seems to enlighten and generate rich overview of the challenges and possibilities of developing sustainability competences in various educational contexts in different countries. The data produces an understanding of the need for sustainability competences in the educational practice that is valuable in further operationalizing the sustainability competence framework and creating tools for addressing the challenges of promoting sustainability.

## 4 FINDINGS

This chapter presents the findings deriving from both crowdsourcing practices: workshops and online discussions on eDelphi. Section 4.1 condenses the common aspects brought up in the workshop concerning the factors that enables or constrain the promotion of sustainability competences in education in general. Section 4.2 focuses on the topics addressed in the workshops for universities. Section 4.3 reviews the perspectives of upper secondary school students and young people on sustainability education, while section 4.4. reports on the aspects of sustainability education raised by the representatives of the indigenous Sámi people in Finland. The findings summarised in the sections 4.1 – 4.4 are based on the inductive analysis.

Section 4.5 examines the cross-country variation in the discussion concerning the competences and the environmental performance based on both inductive and deductive analyses. Section 4.6 describes the findings of the inductive analysis on eDelphi discussions. Finally, section 4.7 provides some examples and reflections on the individual and collective competences, as well as on environmental performance and practices.

### 4.1 Constraints and enablers of sustainability education

This section summarizes the general constraints and enablers of sustainability education as identified via an inductive analysis of data. These aspects, derived from the workshop discussions in the four countries, seem to be common across all levels of education, educational context, culture, and type of organization. However, as the workshops for especially in Portugal or Romania focused mainly on the environmental performance, hence the factors enabling or constraining sustainability education were not explicitly mentioned in the Post-it notes written by the workshop participants. Nevertheless, these were raised during the concluding reflections at the workshops.

The workshop participants' reflections suggest that valuing sustainability, sufficient knowledge about sustainability issues, and understanding the relevance of sustainability are essential preconditions for investments in human, economic or material resources in the development of sustainability education. There seemed to be a general understanding among the workshop participants that successful sustainability education and advocacy for sustainability necessitates visions, effective strategies, sufficient resources, and adequate infrastructure. Lack of time among the teachers and insufficient understanding of sustainability were also regarded as key constraints. Therefore, the management's role was regarded as the key in promoting sustainability

by ensuring the quality of sustainability education, encouraging individual initiatives and developing sustainability actions and competences among students and personnel.

Moreover, participatory approaches were regarded as central in promoting engagement among staff and students. Furthermore, critical thinking, adaptation, and ability to handle ambiguity were highlighted as essential skills enabling individuals to act for sustainability and cope with conflicts in the context of our dominant culture characterised by consumerism and competition – values reflected also in education.

According to the participants' reflections, the quality of sustainability education depends on the curricula, teachers' education and materials, implementation of sustainability education, and evaluation of sustainability competences. Hierarchical organization, lack of strategic planning, as well as decontextualized and dogmatic teaching, which lacks continuity and ability to foster critical thinking are characteristic of poor implementation of sustainability education.

Cross-curricular, interdisciplinary education with designed continuity – including meaningful project-based learning that integrates theory and practice – were seen as essential tools for successful sustainability education. Moreover, openness to and relations with the society and the surrounding community were regarded as important for the promotion of sustainability education. Furthermore, the crowdsourcing participants considered that investments were needed to ensure functional infrastructure, high-quality learning material, and a conducive environment.

While this section focused on the general constraints and enablers of sustainability education in compulsory schools and other educational contexts, the following section addresses the issues raised in the workshops focusing on sustainability in higher education.

## **4.2 Higher education and sustainability**

This section addresses the issues brought up in the workshops organized in the universities in Finland, Romania, and Spain. Especially in Finland and Spain, the participants considered that universities can act as agents for change. The participants argued that in order for universities to serve as relevant actors for change, the traditional academic focus solely on pure scientific knowledge, with productivity as measured by academic degrees and publications, needs to be questioned. They stated that the universities have the potential to act as drivers for change, but this necessitates redefining missions, strategies, legacy; and that sustainability needs be prioritized also in the allocation of economic and human resources. Moreover, the management should seek to develop sustainable communities within the universities, and respect and rely on scientific knowledge concerning the best practices for promoting sustainability.

Sustainability seems to be a marginal issue in Romania, while in Finland the topic is more visible and integrated in the strategies of the universities. However, some participants claimed that universities are economically dependent on unsustainable business and that universities often merely pay lip service to sustainability to or resort to green washing instead of taking genuinely sustainable action. Advancing sustainability requires that human resources are allocated to promoting sustainability within the universities, to communication, and to participation of the university in the efforts to foster sustainability in society at large. These require the commitment of the university management. Time-consuming bureaucracy and work overload constrain the active involvement of researchers in advocating sustainability.

The participants felt that the acute societal sustainability crises mean that curricula must be updated to respond to the need for sustainability competences at all levels and disciplines. The participants mentioned that the quality of sustainability in higher education depends on the extent to which the various actors involved consider and understand the interconnectedness of the various dimensions of sustainability: ecological, economic, social and cultural. Therefore, transdisciplinarity is a prerequisite for understanding sustainability. The workshop participants especially in Romania and Spain noted the need to balance theory and practice. In the best case, expert knowledge would be available and applied in activities designed to promote sustainability.

In the worst-case scenario imagined by the Finnish participants, the university would be a bubble detached from society, operating in a moral vacuum, ignoring its social responsibility, and overlooking diverse views and needs. Free and accessible education, and participatory approaches that respect the plurality of views are conducive to the enhancement of sustainability, whereas hierarchical structures and oligarchy were regarded as constraints in both in Finland and in Spain. In an ideal situation, all the personnel and students are invited to take part in developing sustainable universities as living labs. Discrimination, intolerance, and power imbalances would prevent advancement in sustainability and characterize a nightmare university. A dream university, by contrast, places sustainable well-being of people and the planet at the heart of its activities. Summing up, according to the participants in the partner countries, promotion of sustainability in the university demands reflexivity, human resources, and infrastructure, strategic, emotional, and critical thinking skills, promotion of fairness, as well as respect for the plurality of views and cultural backgrounds.

At the University of Jyväskylä in Finland, sustainability has been successfully advanced by applying scientific knowledge on ecological sustainability produced by the university's own researchers in the effort to promote sustainability in the maintenance and operation of the university facilities. The idea of planetary wellbeing – which considers the wellbeing of humans, other species, and ecosystems – is highlighted in the

university's strategy. Fostering sustainability and planetary wellbeing constitutes a permanent and ongoing process cutting through the activity areas of the university. The workshop participants considered that it demands a lot work to truly include and integrate sustainability in the curriculum of all fields of higher education, and to develop requisite pedagogical skills among the personnel.

The students in our partner countries pointed out that the prevailing culture of competition is a challenge that prevents sustainability thinking and behaviour at the university. Economic efficiency and productivity are dominant values and goals of the university. The students also perceived that the climate crisis is not taken seriously enough and the readiness to make necessary changes and to take action is missing. The students saw ecological sustainability as an intergenerational issue. The students questioned whether the worries presented by young people regarding the future are listened to and taken seriously. Collective understanding and common vision for sustainability are needed. Sustainability issues should be continuously brought up and communicated everywhere, the participants in Finland argued. They argued that sustainable alternatives are available and realisable, and sustainable choices should therefore be made accessible and their impact made visible for everyone, especially in university restaurants.

### **4.3 The views of upper secondary school students and young people on sustainability education**

The participants of the workshops for upper secondary school students and young people perceived the quality of sustainability education to depend on the teacher-student relationships. It is vital that students be treated equally, with respect, support, empathy, with broad- and open-mindedness rather than in an unequal, unrespectful, and narrow-minded manner. An atmosphere of trust, equity and respect of plurality are essential for the students, who furthermore argued that sustainable well-being issues should be taken more seriously. In a nightmare school, teachers would be uncaring, prickly, bossy, or inflexible, and would emphasize only their personal values and interests through teaching, students reflected.

The students call for a greater role for the school management in emphasizing, encouraging, and controlling sustainability procurement practices and behaviour. The students suggested that the schools could organise events and competitions related to sustainability. They saw families play a central role in either supporting or undermining sustainability by transmitting values, providing examples, and establishing practices. Students likewise underlined the high potential of the municipalities to enable

sustainability by providing and maintaining good-quality buildings and public transport infrastructure, effective recycling and waste systems, and green areas.

The Finnish upper secondary school students brought up the societies' role in ensuring the resources for free, preferably vegetarian school meals and in encouraging the inclusion of the youth in various societal activities. Decision-makers should make their decisions in an unhurried manner, after careful consideration, with the aim of fostering sustainability. Sustainable lifestyles should be integrated in the curriculum. The concern for the planet's future was the main ecological concern evoked by the participants also in the workshop for the socially vulnerable young adults. Furthermore, the socially vulnerable young participants underlined the need to take issues of discrimination and accessibility seriously.

#### **Relevance of attitudes**

The importance of the attitudes – as one component of the competences – were raised as an important by many crowdsourcing participants. We here recount two prominent examples featured in the data.

The first example, featuring especially in the Finnish data concerns the attitude of indifference of students, teachers and even and even rectors towards sustainability. For example, acting indifferently towards reducing or recycling waste, or sparing use of material resources was mentioned in several occasions.

The second example featured in the data relates to the emotional aspects of sustainability education and to mobilising people to act for sustainability. Teachers may worry about increasing anxiety and fear amongst students when teaching about the current sustainability crises; especially climate change and mass extinction of species. The demonstration site participants expressed concerns on how to teach young people about the seriousness of the current crises of the global ecosystems while nevertheless cultivating hope and resilience at the face of these crises. How to avoid negativity and emphasize successes already achieved, how to encourage the positive aspects of sustainability and strengthen trust in effective sustainability action while avoiding wishful thinking or naïve optimism? These are amongst the pertinent questions ECF4CLIM strives to address.

## 4.4 Indigenous Sámi people's perspectives on sustainability education

According to the representatives of the Sámi workshop in Finland, the key issue in sustainability education was the specific cultural background of the Sámi children. For the Sámi people, the priority would be to engage the local community in teaching and learning together in employing in practice the traditional knowledge and know-how about sustainable lifestyles. However, traditional knowledge is not valued or respected among Finnish teachers or municipalities.

Sustainability is a core value and priority within the Sámi culture, the participants stated. Even though nowadays majority of the Sámi people do not live in the northern Sámi area, the relation to the cultural roots, northern landscapes, and nature remains important for them. Sustainability and conserving land in the fragile northern ecosystems are priorities for the Sámi people.

The Sámi language has a central role in learning about the culture and connection with nature, the participants argued. Even though the Sámi language has an official status in the national curriculum of Finland, due to the lack of resources, and for example due to the strict criteria for the minimum group size for school classes, the Sámi people's right for learning and education in their mother tongue is not respected. European Court for Human Rights have given several notices to Finland about this issue.

The participants considered that young Sámi people living in the north of Finland are especially vulnerable to problems generated by climate change. The young Sámi people are worried about their future and the future of the northern nature, which global warming threatens to destroy. Climate change threatens concretely their traditional reindeer herding and other traditional livelihoods that depend on nature, e.g., fishing and berry-picking, as the northern nature cannot adapt to warmer temperatures. Especially in the challenging circumstances created by climate change, the young Sámi people need to help their families in reindeer herding, which in turn feeds school absences and undermines their studies.

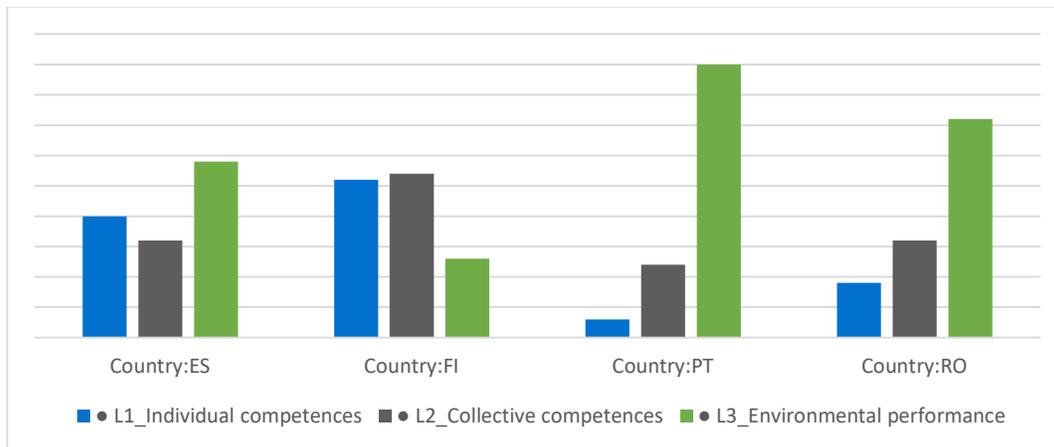
The expansion of mining and wind power also threaten the northern nature. The Sámi people therefore strongly reject these activities, which would nevertheless be essential technological solutions for climate change mitigation, the participants argued. There have been local land-use conflicts that reflect the social relations within small northern communities. The Sámi people are vulnerable to discrimination, for multiple reasons deriving from history. Besides, a pressure to adapt the dominant Finnish culture is strong among the young Sámi people living outside of the traditional Sámi area.

## 4.5 Competences and GreenComp in different countries

In this section, the comments by the workshop participants are examined relation to the specificities of the country in question, individual and collective competences, environmental performance and practices, and the European Sustainability Framework GreenComp. These comparisons produce some interesting insights into the crowdsourcing data.

### *Differences between countries regarding the approach to competences*

There were differences between our case study countries that are worth consideration when developing sustainability education in the various countries of the ECF4CLIM project. As detailed in our research plan, the constraints and enablers of sustainability education were analysed from three standpoints: individual competences, collective competences, and environmental performance. Figure 6 illustrates the differences in the focus of discussion between our four case study countries. In Finland, the focus was less on environmental performance, while in the Spanish discussions, individual competences received greater attention than in Romania and Portugal.



*Figure 6. The number of Post It/ Flinga notes coded to each standpoint (individual competences, collective competences, environmental practices) in the data from our four case study countries<sup>1</sup>.*

<sup>1</sup> Graphs in this section results from partial data, a random sample of 60 notes from each country, in total, 240 notes.

### *GreenComp and differences between countries*

When analysing the notes written in the workshops in the light of the GreenComp<sup>2</sup> framework (Figure 7), we were able to identify all twelve competences. However, some of the competences were more prominent than others and the occurrence of the sustainability competences varied from country to country.

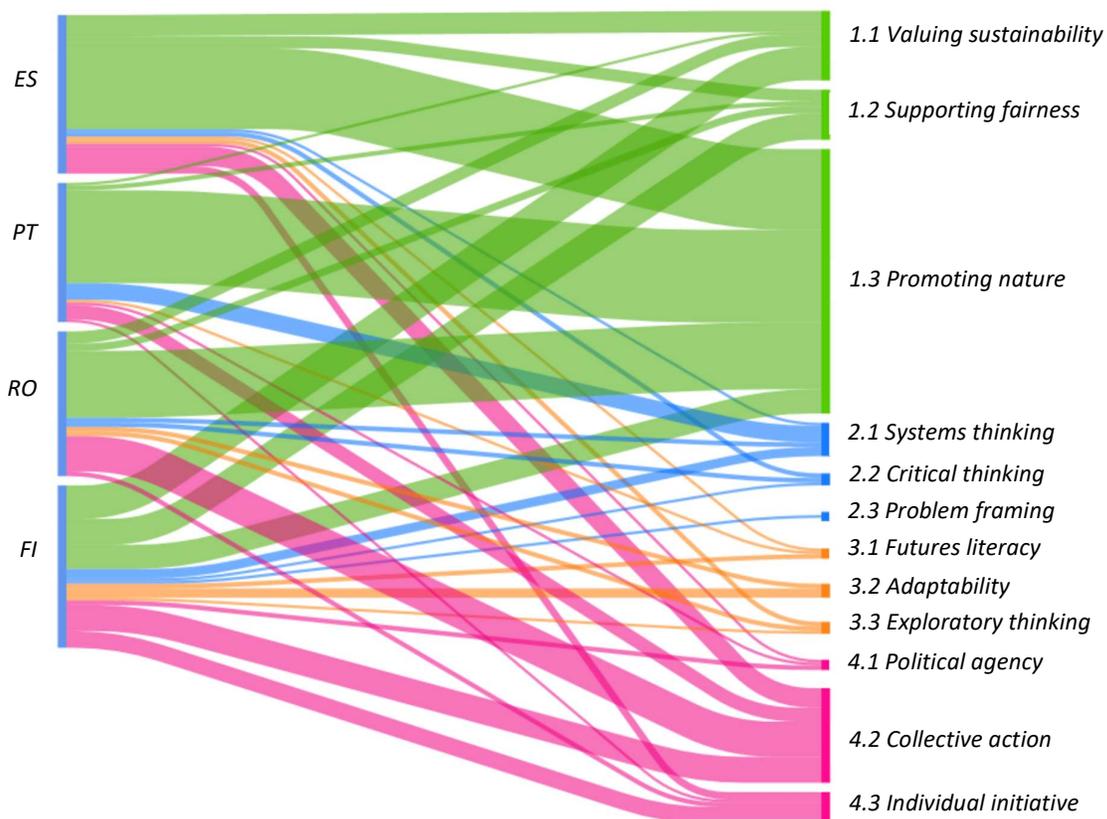


Figure 7. Sankey diagram: Connections of the notes from the workshops to the GreenComp competences, by country

<sup>2</sup> See the definition of the knowledge, skills and attitudes of each competence on GreenComp [https://joint-research-centre.ec.europa.eu/greencomp-european-sustainability-competence-framework\\_en](https://joint-research-centre.ec.europa.eu/greencomp-european-sustainability-competence-framework_en)

The competence area 'Embodying sustainability values' and the competence 'Promoting nature' were the most often addressed in the workshops. In the GreenComp this competence area includes assessing one's own impact on nature and identifying processes or action that can avoid or reduce the use of natural resources. In the Spanish, Portuguese, and Romanian data, these the were most evoked competences. It must be mentioned that in the notes from Portugal, values were discussed only minimally.

Themes related to the competence areas 'Embracing complexity in sustainability' and 'Envisioning sustainable futures' were often not written down in the notes and received relatively little attention in the workshops. However, statements relating to 'Systems thinking' (which is part of 'Embracing complexity in sustainability') were visible as statements about circular economy, which are included in GreenComp's knowledge descriptors as 'life cycle thinking'.

Many notes were related to the area 'Acting for sustainability'. This was unsurprising in view of the guidelines given to the workshop participants. In fact, we would have expected even greater attention to this topic area. The competence to which the notes most often related in this area was 'collective action'. This supports the analysis above: Participatory approaches were regarded as central in promoting engagement among staff and students. Notes addressing 'Political agency' were scarce. It is interesting that in Romania, connections to 'Political agency' were absent.

### ***Relations between GreenComp and approaches to competences***

The relations between GreenComp, individual and collective competences, and environmental performance were clearly identifiable in the data. Figure 8 shows how the most often mentioned area, 'Promoting nature', relates to environmental performance and practices. Obviously, collective competences are tightly connected to the GreenComp competence 'Collective action'. Individual competences have the strongest relations to the competence area 'Embodying sustainability values'.

Some notes of the workshops, mainly from Spain and Finland, also reflect upon the question of who are responsible for taking the actions <sup>3</sup>described; whether it be the students, teachers, principals, other school staff, the school organisation, parents, or the society at large. This reflection was requested in the guiding questions for the workshops. Interestingly, the Finnish participants named most often the other staff of the school and the society as the main actors when talking about environmental practices and performance, whereas in the other three countries the school organisation was regarded as the main actor. In Spain, the main actor with respect to individual competences seems to be the teacher, while in the other countries, students were

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<sup>3</sup> The role of each actant in sustainability education was asked by the workshop questions presented on the page 15.

attributed an equally significant role as teachers in strengthening individual competences. In all four countries, the school organisation was seen as an important actor responsible for promoting collective competences.

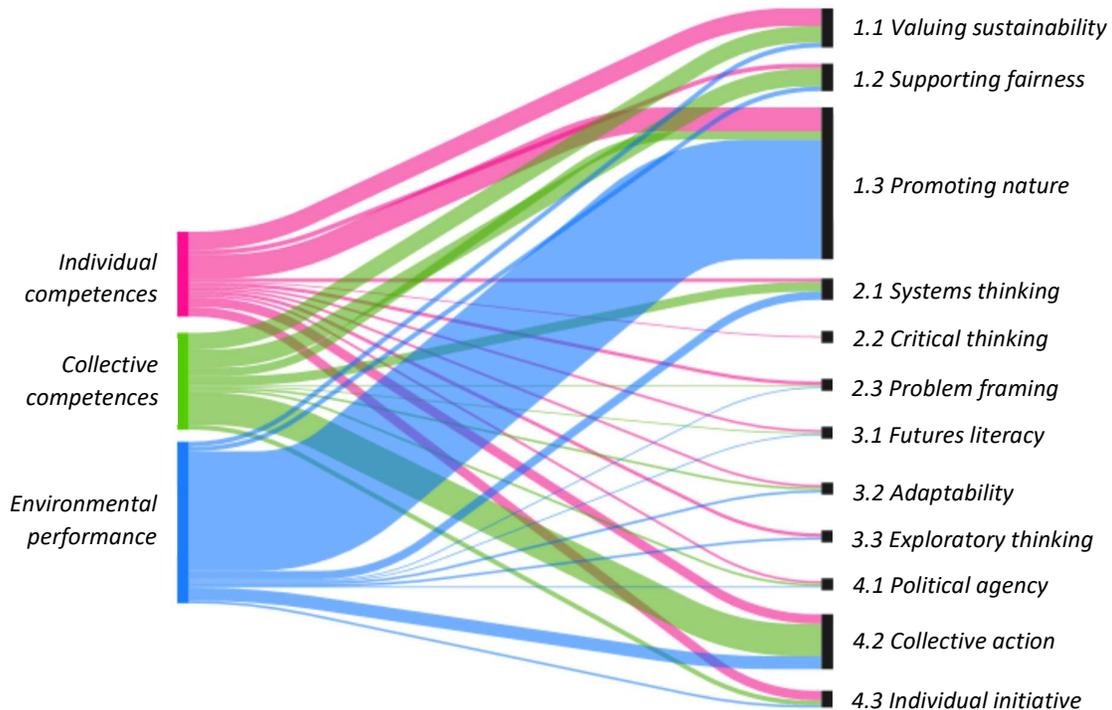


Figure 8. Connections from individual competences, collective competences and environmental performance and practices to GreenComp in workshop notes.

## 4.6 Findings from the eDelphi discussion

Discussion on the eDelphi platform included four topics that emerged from the workshops. In this section, we use an inductive approach to analyse the data collected through eDelphi. The results are presented by topics/questions. All the discussion data collected by 29th June 2022 is included in the analysis.

### *Engagement with sustainability*

The first discussion opened on the eDelphi platform addressed the best ways to mobilise schools, universities, and individuals to take action towards sustainability. The importance of engagement was one of the key results of the workshops.

On eDelphi, the participants could judge the relative significance of three alternative approaches to engaging schools with sustainability (Figure 9). These approaches, 1) participatory approach, 2) invoking the responsibility of individuals, and 3) administrative regulation, were brought up also during the discussions in the workshops. Nobody stated that all of these approaches lacked significance, and few considered any of the approaches (most often administrative regulation) as not significant. Nearly half of the participants thought that a participatory approach was very significant, and all except one said it to be significant or very significant.

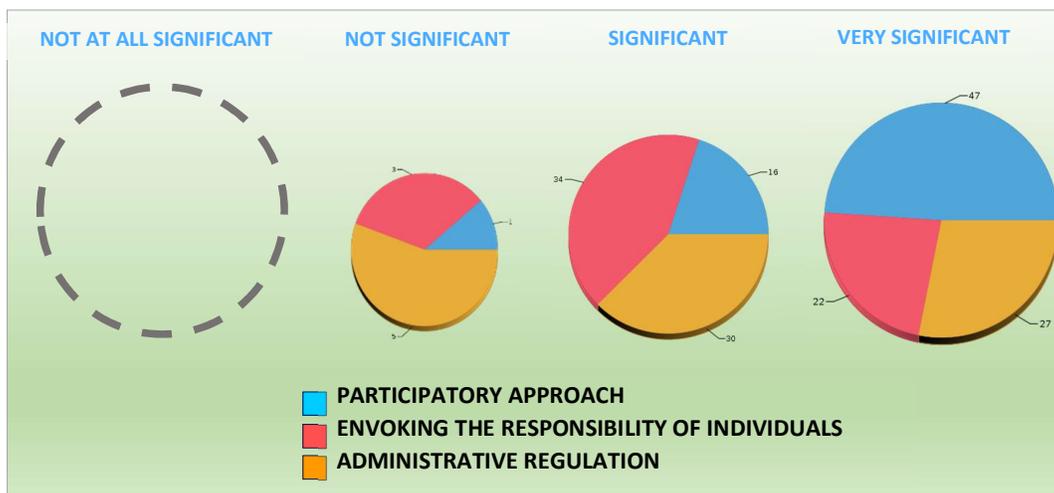


Figure 9. Significance of different approaches in engaging schools and universities.

The facilitating question for this first discussion was: What are the best ways to engage schools/universities and individuals to take action towards sustainability? There were four viewpoints to engagement that participants talked about: (1) Policies and regulation; (2) Activity; (3) Methods of engaging people; and (4) Contents in activity relating to engagement.

When talking about the first viewpoint, (1) policies and regulation, the participants brought up the importance of legislation, obligations from above, and decisions of the school itself. They saw strategies, plans and curriculum as significant documents. Some asked for theories, definitions, and goals of sustainability work. Management of the school or university was mentioned most often as a key actor, but also national decision makers were present in the discussion. Participants saw structures, such as a national model for sustainability education and certification systems, welcome. Many participants said that resources and prioritising sustainability in decisions are key factors. Prioritising can be used for example in recruiting new staff to school.

Statements about other three viewpoints (activity, methods, and contents) focused on participatory approaches. According to the participants, the second approach, (2) activity, is embedded in the school culture, in the entire community and even in the whole society. Local viewpoints, cultural characteristics and inclusion of all were considered important for engaging people in sustainability. Schools' openness towards its surrounding community and cooperation both inside the school as well as with parents and other organisations were considered significant factors. Students must be seen as active agents, too. Concerning engagement, an important factor is to embed activities and participation to everyday life and concrete practices.

Participants mentioned many examples of the third approach, (3) methods, to be used in engaging people at school in sustainability education and activities. In educational settings, teaching and pedagogy are credible ways of engaging students. Many participants wrote about awareness campaigns and ways of evoking, inspiring, and motivating actors to engage with sustainability activities. Also appealing to responsibility was one method mentioned in the data. Pedagogical approaches, such as discussions, deep learning, interdisciplinarity, and learning out of the classroom were mentioned. Tools, materials, and models were seen as necessary. Many participants discussed the importance of projects in engaging people. Also more specific modes of action were mentioned, such as competitions, using media, internet portals, benchmarking good examples, and assessment of sustainability. Support for actors in educational settings is needed, and teacher trainings are a good instrument for that. Teachers are important as examples of sustainable actions. Participants saw also peer-to-peer activities beneficial. Good infrastructure was seen to support engagement.

The participants also brought up certain (4) contents as being important for engaging sustainability matters in education. Knowledge (for example of the pillars of sustainability), skills (for example creativity), attitudes (for example empathy), were all considered important. Human-nature relationship and a belief in a bright future were discussed.

### ***GreenComp***

Given that the GreenComp, the European Competence Framework for Sustainability, is one of the starting points for the ECF4CLIM project, the next task in eDelphi discussion focused on evaluating the comprehensiveness of GreenComp and its connections with the participants' own work.

The participants could choose, on a sliding scale, how comprehensive they thought the description of the GreenComp was (Figure 10). Nobody considered the GreenComp as clearly 'not comprehensive'. One estimated the GreenComp as in between 'not

comprehensive’ and ‘comprehensive’. The answers suggest that the participants view the GreenComp as relatively but not fully comprehensive.

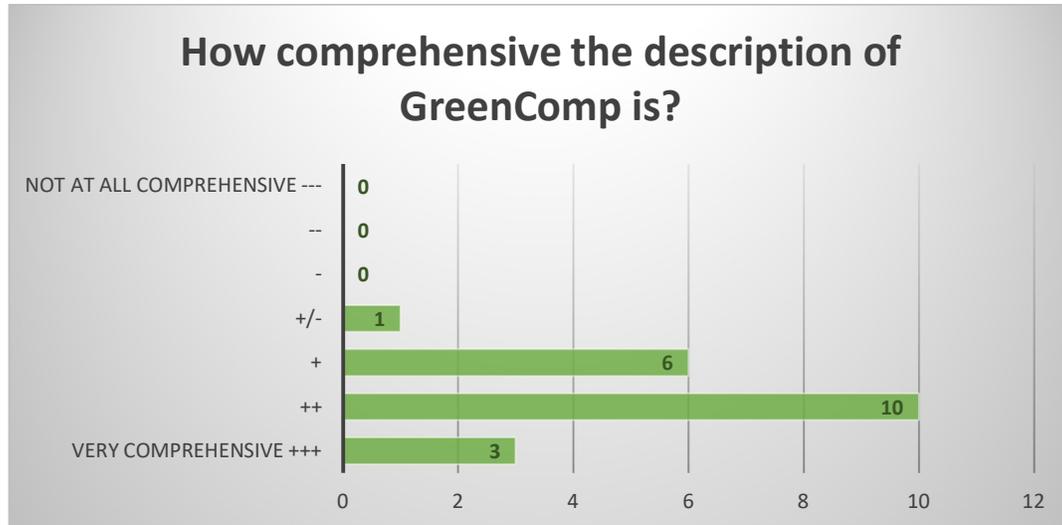


Figure 10. Comprehensiveness of the The GreenComp framework.

In the discussion part, participants were asked to discuss the following two questions: “Which areas of the GreenComp have you already promoted in your work and how?” “Is something essential missing from the GreenComp?” Participants brought up (1) tasks in their work; (2) important objectives; and (3) assessment of the GreenComp.

Participants listed some (1) tasks in their work that they think are connected to the GreenComp. These were for example teaching, teacher training, projects, events, teamwork, making materials, assessing, cooperation, and working with policies and strategy work. They think that they are acting in accordance with the GreenComp when they are making choices, sharing knowledge and encouraging others. Participants also mentioned discussions, cooperation, and integrating sustainability in regular activities and different subjects. Some interesting examples of models were mentioned, like Service & Learning, University gardens, and peer-to-peer approaches.

Participants talked about their (2) objectives with respect to the GreenComp. Values, positive attitude, emotions and involvement were emphasized. The GreenComp was seen to be in accordance with curriculum and other common objectives of sustainability, individual behavioural change, and acting for sustainability. The GreenComp was generally regarded as a good basis for pedagogy.

Many participants listed competences of the GreenComp which are most essential in their work. Some participants stated that all areas of the GreenComp are essential.

Competence 4.3 ‘Collective action’ got most mentions from participants (Figure 11). The least referred competence was 2.3 Problem framing.

Many participants viewed the GreenComp as a comprehensive framework for sustainability competences, and saw it to help promoting sustainability at schools. One participant thought that environmental education and everyday practices were missing from the GreenComp. Some participants had a negative perception regarding the GreenComp: for example, in the current school culture the GreenComp was seen only as a paper, the current climate emergency was seen as too urgent to engage with such a participatory approach, the competences of the GreenComp were seen as hard to measure, and the fact that all actors at schools never adopt the ideas was seen as an impediment.

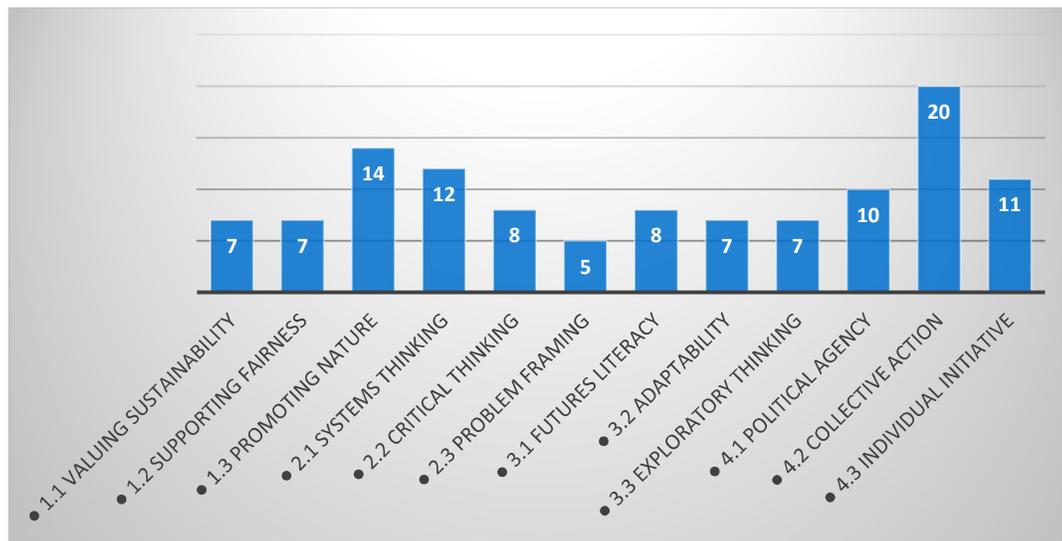


Figure 11. Most essential competences of The GreenComp in the work of eDelphi participants.

### Concrete steps

To identify concrete ways to operationalize competences, in the third phase the participants were asked some open questions: What concrete steps are needed to move towards a sustainable school and education? Who will lead the change, and how? There were four viewpoints to concrete steps that participants talked about: (1) Governing; (2) Collective action; (3) Tools for change; and (4) Pedagogical approaches.

Many participants discussed (1) governing: involvement of national institutions and decision makers as well as the management of the school or the university in the process of change. A view was expressed that there should be mandatory requirements for

educational institutions, structures for action, national programs and models, strategies, and plans. Competences and methodologies should be defined, objectives operationalized, and sustainability issues prioritised as part of a governance process. Development of education is important, and curricula should comprehensively include sustainability issues. Students should have opportunities to participate in decisions. Sufficient resources should be allocated for the sustainability work of schools and universities.

Another significant area regarding concrete steps illuminated in the data is (2) collective action. The participants saw participatory approach as important. Cooperation and involvement of all staff and age groups to the implementation of the sustainability competences is essential. One participant stated that consensus between groups is important. Teams or working groups, and networks are good arenas for collective action.

The participants introduced some (3) tools for change. Education was seen as the main tool. Training and other support for teachers and other staff was considered very important. There should be materials and models for sustainability education available. School culture, practices, and everyday life at schools and university should strive for sustainability. Also assessment practices could be used as a tool for progress. The participants saw also some background factors, such as democratic society, wellbeing of people, proper infrastructures and green spaces important in changing schools and universities towards more sustainable agents.

Different (4) pedagogical approaches and methods were assessed being useful for taking concrete steps towards sustainability. The participants talked about interdisciplinarity, learning in practice, experiential learning, creative approaches, emotional education, and learning out of the classroom. Projects, events, theme weeks, and campaigns were suggested as useful models. One participant mentioned the significance of environmental economics in understanding the state of the world.

### ***The most important sustainability competences***

The last question arose from an observation made in the previous phases of discussion: competences, which are the core issue in ECF4CLIM, were not explicitly and deeply covered in the earlier stages of the eDelphi discussion. The facilitating question for this last discussion was: “In your opinion, what is the most important sustainability competence/content that individuals and collectivities must learn and why?” There were three viewpoints to competences that participants talked about: (1) acting for sustainability; (2) valuing sustainability; and (3) different abilities.

The participants regarded competences connected to (1) acting for sustainability most valuable. Some participants connected these competences with school culture,

everyday practices and assessment behavior. Others paid more attention to political agency and active citizenship. There were also those who emphasized collective action for sustainability and cooperation.

Also (2) valuing sustainability was important for many participants, who discussed values, world view, prioritizing sustainability, positive attitudes towards nature, and human-nature relationship. Awareness and concern about environment were also mentioned. One participant prioritized responsibility for future generations - human and non-human alike.

Participants highlighted also (3) different abilities that school communities should acquire. Transversal skills were appreciated. Training skills, ability to lead the change and ability to communicate were mentioned. The participants viewed competences in critical, systemic, creative and ethical thinking, and knowledge about sustainability, climate emergency and protecting nature as important.

The results of the eDelphi discussion show that the participatory approach in schools was considered important. The data includes relations to all competences of the GreenComp. The key difference between these findings and the data from the workshops is that the environmental practices were emphasized in the workshops, but in the eDelphi discussion they were not present to that extent; possibly due to the differences in facilitating the discussions and phrasing the questions.

It is difficult to compare the participating countries on the basis of the eDelphi discussions, because for example only few participants from Portugal took part in eDelphi, and the number of participants was generally rather low. Two differences were obvious, though: in Finland, participants discussed much more about regulations, strategies, and structures regarding engagement with sustainability at educational organisations than the participants from southern European countries; while awareness campaigns were seen as highly relevant among the participants from southern European countries.

These results and further analysis of eDelphi discussion will be useful in operationalizing the competence framework for sustainability in educational settings (Task 3.3) and will give a solid background for audits of individual and collective competences (Tasks 4.1 and 4.2) given that the data includes many examples of functional practises and innovations from participants.

## 4.7 Individual competences, collective competences, and environmental performance

All three dimensions of sustainability education and competences in our research design – individual competences, collective competences, and environmental performance – were present in the crowdsourcing data. In the following section, some examples of all three dimensions are presented.

### *Individual competences*

Individual competences can allude to “development of a combination of personal qualities and (possibly) qualifications” (Vare 2022).

The participants of the crowdsourcing suggested that preference for sustainability is a desirable competence for individuals: Promoting sustainability and valuing nature leads to sustainable choices. Competences related to activity, participation, and individual initiatives are needed in this effort. In the best case, an active individual can enable also others to take an active role in promoting sustainability.

The participants were of the opinion, that learning must be research-based and connected to real life issues. Competences in systemic thinking and valuing nature, including interdisciplinarity and planetary wisdom, are important. Critical, creative, and strategic thinking were appreciated by the participants, too. Awareness of and interest in sustainability, receptiveness, responsibility, altruism, and respect for others were stated as desirable individual competences regarding sustainability.

### *Collective competences*

One way of defining competence is to say that it is “an innate quality or potential that lies within a given organism, institution or system” (Vare 2022). This definition sits well with the concept “collective competence”. Drawing from institutional theory and the notion that institutions comprise different pillars (Scott 2013, 60), three broad categories of collective competences are distinguished in the ECF4CLIM project: 1) Regulative; 2) Normative; and 3) Cultural-cognitive competences. Next, the collective competences appearing in the crowdsourcing data are described with a view of these categories.

Regulative competences derive from written rules and stipulations and relate to fulfilling regulatory duties. The participants of our crowdsourcing practices brought up two kinds of regulative issues: First, the need for legislation to include sustainability in everyday school or university life, and second, including sustainability in the contents of curriculum.

Normative competences are constructed around norms and values relating to sustainable development, and are institutionalised in the organisation's own strategies, programmes of action, plans, and guidelines. The participants of crowdsourcing discussed about local decisions, strategies, and regulation for promoting sustainability. The participants regarded allocating time for promoting sustainability as important. Suitable/functional pedagogical approaches were also regarded as essential for learning about transdisciplinary sustainability issues, for example multidisciplinary learning, was mentioned by the participants. Educational organisations should allocate enough resources and provide both personal and financial incentives for promoting sustainability. Development of sustainability education and improving infrastructure for sustainability require time and resources.

Cultural-cognitive competences refer to the organisation's operating culture and include wider institutional frameworks that provide internalised organising models and scripts. According to participants of the crowdsourcing exercise, collective vision of a sustainable future is important. The sense of community supports sustainability, while individualism triggers conflicts. Successful collective action for sustainability promotes hope that helps the organisations overcome an atmosphere of indifference. Support of the leaders, fairness, and participatory approaches were regarded as beneficial in successful implementation of sustainability education. Collective action in improving sustainability within the school or university was also seen as important. Additionally, the participants argued that sustainability work should be rooted in concrete actions. The participants regarded cooperation with stakeholders as a relevant part of a high quality school/university culture. Families can also support building of the sustainable school culture.

### ***Environmental performance***

Environmental performance and practices in educational settings are important factors when trying to move from an unsustainable present towards a sustainable future: a large percentage of people study or work in educational organisations every day, and the resulting cumulative environmental load is considerable. In addition to this direct negative environmental impact, education can have an indirect positive impact through learning. These two come together when scrutinizing environmental performance of educational organisations – learning about environmental impact and simultaneously minimizing it.

Statements about environmental performance appeared widely in the data, especially in the three Southern European countries. The participants highlighted aspects related to environmentally less harmful building practices and infrastructure, such as insulation, ventilation, types of windows, and green spaces both inside and outside schools or universities. In addition to these aspects of environmentally sustainable equipment and

facilities, participants mentioned aspects that are not directly related to environmental sustainability but could be factors of quality teaching and wellbeing. Financing the construction and maintenance of buildings and facilities with greater environmental performance was noted as an important aspect.

Saving vs. wasting resources was the topic most often mentioned by the participants. Comments addressed these aspects in relation to the use of energy, water, and paper, as well as procurement practices. Many technical solutions were brought up by the participants: using digital materials instead of paper, solar panels, sensors in water taps and lightning, automatic ventilation, and methods for proper insulation. In addition, some solutions to decrease the environmental impact of schools and universities were mentioned that can be achieved by learning and changing one's habits. These were mentioned most often with respect to energy, paper, and water use, but also waste management and recycling were highlighted. Furthermore, environment-friendly cleaning, meal services, and transportation were mentioned. Participants also suggested more environmentally friendly transport options such as cycling, public transport, car sharing, electric vehicles like minibuses, and the need to create conditions favourable to these alternatives.

## 5 CONCLUSIONS

The crowdsourcing process in general (Task 3.1), together with the literature review and analyses of existing policy frameworks (Task 3.2), provides an overview of what kind of needs, participatory tools and interventions would be most suitable for different contexts, and what kind of issues the educational stakeholders find most relevant. These tasks form a basis for the development of the first draft of the operationalised European Competence Framework (Task 3.3) that will be tested and evaluated during the three coming years of ECF4CLIM project.

In terms of the limitations of the study, it is worth mentioning that the number of the participants in some workshops was small. Therefore, all the discussions did not generate a comprehensive view of all the stakeholders. Besides, the focus of the workshops conducted in the four countries varied, which in turn translated into variation in the nature of the data obtained. Some groups were underrepresented: for example the data collected in Portugal was scarce and the reflections were not comprehensive. On the other hand, some groups were overrepresented, for example the experts from governmental and non-governmental organisations for sustainability education in Finland.

However, despite the challenges of getting people to participate in the crowdsourcing events, the whole crowdsourcing process generated a rich body of evidence and provided an overview of the issues constraining and enabling the promotion of sustainability in education in diverse contexts. The crowdsourcing process generates a broad overview on the three dimensions of ECF4CLIM – individual and collective competences, and environmental performance. All the areas of GreenComp were present both in workshops and in the eDelphi discussion. While some areas of GreenComp were discussed more than others, this imbalance provides insights into discussing where the focus in advancing sustainability should be. Should the competences and issues that were more talked about and regarded as relevant by the crowdsourcing participants get more attention or should the more attention be paid on the competences that were not mentioned so often to succeed in advocating of sustainability?

However, the diversity of local circumstances, needs and interests should be considered in designing successful tools to advocate sustainability in education. In some countries, such as Romania, the lack of infrastructure, poor status of the teaching profession, and suboptimal functioning of the educational system were regarded as the main constraints. In contrast, in those countries or contexts in which lack of infrastructure is not an issue, the skills in engaging people and using the infrastructure to foster sustainability competences are the most critical aspects.

The crowdsourcing approach applied in this project faced a paradox typical of participatory action research and citizen science: how to promote and enable people's voluntary and inclusive participation?

This was felt acutely also by the researchers facilitating the crowdsourcing exercise. On the one hand, we can't just wait for what people themselves come up with the sustainability issues that are relevant to them, but we must prompt some kind of a collective will-formation. We must inspire and enable people to participate but where is the thin line between participation and manipulation? On the other hand, we can't force or persuade citizens to participate on a given way. The solution to this problem is not only the challenge for this project, but more generally one of the core issues in the development of deliberative democracy and citizen science. In the current state of immense acute sustainability crises there is a limited amount of time for deliberative discussion, as concrete decisions and practices are urgently needed for effective transformations to sustainability. However, engaging people in the participatory approaches has been regarded as important in this project, and thus a crowdsourcing has turned out to be a promising approach worth developing further in the context of competence development for sustainability.

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## APPENDIX 1

### Crowdsourcing workshops spring 2022

<b>Spain</b>		
<b>5 workshops</b>		
Escuela Técnica Superior de Ingeniería de Sevilla 22.2.2022	Face-to-face	20 students from 7 secondary education schools, including 6 students from IES ITACA, ECF4CLIM demonstration site
Escuela Técnica Superior de Arquitectura 22.3.2022	Face-to-face	20 students from 7 secondary education schools
Stakeholders Workshop 30.3.2022	Online	22 Stakeholders: Policy makers in the educational/sustainability area (national and regional level) (11), practitioners of education for sustainability (NGOs, foundations, etc.) (7), universities (3), and teachers (1).
Teachers' Training Course "Schools for Climate" (CTIF) 9.3.2022	Face-to-face	14 Teachers: Secondary School (7), Vocational Training (4), Primary School (3).
Autonoma University of Barcelona 22.4.2022	Face-to-face	18 Students (4), teachers (8), other staff (6)
"CEIP Mozart" Primary school 22.5.2022	Face-to-face	20 People from the demonstration site: students 5 <sup>th</sup> &6 <sup>th</sup> grade (12), the director, the secretary, people of the staff (3), teachers (2) and a mother
<b>Portugal</b>		
<b>3 workshops</b>		
EB Camarate 2.5.2022	Face-to-face	14 Teachers and students from EB Camarate, EB Bobadela, and Instituto Superior Técnico from University of Lisbon
EB Bobadela 5. and 12.5.2022	Face-to-face	23 Students - two 5 <sup>th</sup> grade classes
ISQ 12.5.2022	Face-to-face	8 Members of the R&D unit working in research areas related with environment and sustainability (4), stakeholders interested in the topic (4)
<b>Romania</b>		
<b>6 workshops</b>		
University of Pitesti 7.3.2022	Face-to-face	14 Demonstration site

CRED -a network of teachers 22.3.2022	Online	5 Stakeholders
CRED -a network of teachers 26.3.2022	Online	4 Stakeholders
High School "Lulia Zamfirescu", Mioveni 31.3.2022	Online	20 Demonstration site, Teachers, people of the staff, students
School "Nicolae Balcescu", Dragasani 6.4.2022	Online	23 Demonstration site, teachers
Stakeholders 14.4.2022	Online	14 Stakeholders
<b>Finland</b>		<b>14 workshops, seminars etc.</b>
Workshop 31.1.2022	Online	15 Stakeholders: teachers, environmental educators (testing workshop)
Workshop 25.2.2022	Online	6 Staff of Finnish National Agency for Education
Workshop 9.3.2022	Online	14 teachers and environmental educators
Workshop 10.3.2022	Online	9 Headmasters
Workshop 22.3.2022	Online	27 Teachers and environmental educators
Homework 22.3.2022	Online	11 Homework for teacher students in University of Helsinki, relating on studies in sustainability education
Workshop 23.3.2022	Online	10 Headmasters
Workshop 24.3.2022	Online	8 Staff and officials responsible of school meals services and maintenance
Seminar 31.3.2022	Hybrid	55 Teachers, principals, researchers, environmental educators, and other stakeholders: Online (37) and Face-to-face (18)
University of Jyväskylä 4.5.2022	Face-to-face	4 Demonstration site: Students from Student Council of University of Jyväskylä
Sámi people 12.4.2022	Online	4 Sámi activists
ECF4CLIM FI Kick Off 28.4.2022	Face-to-face	13 Teachers of demonstration sites (10) and advisory board members (3)



H2020-LC-GD-2020-3, Project 101036505, ECF4CLIM, European Competence Framework for a Low Carbon Economy and Sustainability through Education

**D3.1, Participatory will-formation utilising a broad international crowdsourcing exercise as a method to constitute the basis for the elaboration of an ECF**

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Kohtaus ry 22.5.2022	Face-to-face	6	Socially vulnerable young adults
Sampo Upper Secondary School 2.6.2022	Face-to-face	62	Demonstration site, First year students
<b>International</b>		<b>2 workshops</b>	
WEEC 2022 15.3.2022	Online	3	Researchers
University of Jyväskylä 1.6.2022	Hybrid	20	Teachers, researchers. The event was a part of Wisdom colloquium -series of University of Jyväskylä and EU Green Week -> open for international audiences