

ClimaTePD: "Towards a new model of Teachers' Professional Competence Development on Climate Change"

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Policy proposals for the embedment of climate change with IBL, gamification and digital teaching methods in secondary education

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1. About ClimaTePD

Education plays a key role in fighting climate change. In the case of formal education, teachers can contribute to student development of knowledge, skills and attitudes that work towards this goal. However, in performing climate change education for sustainable development, teachers face several challenges, mainly related to the multidisciplinary and multidimensional nature of the topic.

The Erasmus+ project entitled "Towards a new model of Teachers' Professional Competence Development on Climate Change" (acronym: ClimaTePD) aims at helping in-service secondary teachers in developing digital literacy and climate change teaching skills as means for enabling their students to build awareness about the global threat of climate change. To that goal, it works with different subject areas and dimensions with the aim of promoting subject-specific and crossdisciplinary competences.

To this end, synchronous and asynchronous training course as well as digital teaching scenarios are being developed to support teachers in developing their own activities in online, face-to-face or blended teaching environments. A digital repository of educational resources for climate change education is being created, as well as a handbook with guidelines for teachers.

As the last activities of the ClimaTePD project, IO9 is concerned with synthesizing all the information learnt about climate change education with IBL, gamification and digital tools in order to make policy proposals. In this way, we hope to make the knowledge and expertise developed useful by inspiring changes that can impact the reality of the classrooms.

2. About the policy proposals

IO9 "Policy proposals for the embedment of climate change with IBL, gamification and digital teaching methods in secondary education" aims to develop a coherent set of policy proposals for educational policy makers and relevant stakeholders, focusing on a more holistic dimension of the inclusion of climate change education with IBL, gamification and digital teaching methods in secondary education. Policy proposals are understood in this case as "a written advice that is prepared for a group or person that has the authority to make or influence policy decisions"¹. In other words, policy proposals are helpful for these people or organisations to make decisions based on research or empirical data about the phenomenon that the policy is concerned with.

Therefore, the general objective of IO9 is to provide advice on actions to be taken that maintain and promote climate change education with IBL, gamification and digital tools. This general objective can be broken down into smaller, more specific objectives:

- To contribute to introducing changes in current formal education curricula of Europe state members
- To maintain and support the current tendency of investing public and private resources into climate change education
- To draw attention to the phenomenon of climate change teaching with IBL, gamification and digital tools in secondary school

¹ https://www.lenus.ie/bitstream/handle/10147/221377/Factsheet.pdf?sequence=1&isAllowed=y



- To provide ideas of directions to take in teacher education on the basis of empirical evidence

To achieve these objectives, the consortium carried out previous activities of the project. In IO1, the state of affairs regarding the embedment of climate change and digital teaching skills into TPD schemes and secondary education was diagnosed, as a result of a review of the literature reporting on the cases of countries all around the world and with special focus in the 5 participating countries. On this basis, IO2 focussed on communicating and collaborating with educational stakeholders, policy makers and practitioners from each participating country in order to identify challenges related to climate change with IBL, gamification and digital teaching methods in secondary schools. Two-days workshops, i.e. Multiplier Events E1-E5 were organised in all countries. The partners prepared their national reports on workshops' outcomes in English based on the framework decided. Later, IO3 consisted of the development of digital training scenarios in climate change education with IBL, gamification and digital teaching methods. A main framework was provided, then all partners developed 5 scenarios in their local language and in English. 10 of the 25 digital scenarios prepared by the consortium partners were selected (2 from each country-partner) by teachers, educational stakeholders and other relevant policy makers (workshops participants) from each country through an online voting system. Then, IO4 focused on developing and maintaining an open access online platform for teachers' training on climate change education with IBL, gamification and digital teaching methods. In this platform IO5 was developed, where At least 250 in-service teachers engaged in training activities in the five participating countries via an IBL methodology and other teaching methods such as storytelling, debate and dilemma in order to address socio-scientific issues related to climate change. As a result of this training and other actions, IO7 was completed, which consisted of a Good practices digital repository for climate change education with IBL, gamification and digital teaching methods. Finally, IO8 provided evaluation results of the training.

All these activities, especially those where communication was established with the target users, constitute the basis of IO9. This document accounts for the work developed in IO9, and it is structured as follows: First, the current situation of climate change education with IBL, gamification and digital tools is described. Then, the process followed to make policy proposals that can change the situation is explained. After that, the policy proposals are presented and explained, including the requirements for the development of a climate change teaching competence framework. Later, the plan to disseminate the proposals is presented. Finally, the document presents conclusions and follow-ups.

3. Definition of the issue and existing situation

In order to ensure that the process of developing policy proposals actually responds to the needs of the reality, it is necessary to define the issue and the existing situation. By clarifying the issue, we make sure that the policy proposals will be understood and applied by the right stakeholders and in the appropriate contexts and targets. By defining the existing situation clearly it is possible to make recommendations that build on the strengths of the current reality while addressing its weaknesses (Centre for Ageing Research and Development in Ireland, 2012).

The issue that ClimaTePD project is concerned with can be defined as Climate change education with IBL, gamification and digital tools. Climate change education is a wide concept, which spans



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across several educational contexts (formal, non-formal, informal), and levels (primary, secondary, higher education). In this specific project climate change education has been understood as it manifests in formal, secondary education, and in particular, in teachers' practice. From all the dimensions of teacher practice, the project has focussed on teachers' task to design and carry out learning experiences where students engage with climate issues. More specifically, it has focussed on how to do so with Inquiry-Based Learning, gamification and digital tools.

In terms of defining the current state of this issue, as a result of the work developed in the project, the following statements can be made: 1) There is a big diversity in the representation of climate change issues in the curriculum: in some countries it is explicitly mentioned and has been this way for years, whereas in other countries it is only represented anecdotally and/or has only been recently introduced; 2) Teachers and other stakeholders agree that formal education is key in fighting the current climate crisis because students are key actors in this task; 3) Climate change issues should be taught using student-centered, active methodologies, as it is the case for almost any type of teaching to be done nowadays, but especially considering that climate change involves disciplines that go beyond science; and 4) Teachers are willing to undertake training about this topic or to introduce it in their practice because they are interested, but they not always have the right conditions to do it.

4. Methodological considerations

The key methodological consideration to make the policy proposals is what is "Evidence-based policy" (Pawson, 2006). According to this model, policy recommendations come as a result of research that follows the principles of the scientific method, so to develop knowledge from practice. Since 2006, the European Union has recommended that member states use evidencebased policy in the field of Education by releasing working documents, reports and initiatives (Pellegrini & Vivanet, 2021). Additionally, the principle to involve users was applied, which argues that if users participate in the design of policies, these will be more likely to be successful (Figueiredo Nascimento, Cuccillato, Schade, & Guimaraes Pereira, 2016).

More specifically, a qualitative research approach was used to develop the policies. Qualitative research is oriented on processes and how things work, with the purposes of describing, exploring and understanding social and cultural phenomena (McMillan & Schumacher, 2006). According to this model, and as opposed to quantitative research:

- Social phenomena exist in the mind and in the situated world ٠
- The researcher places herself in the context of the data and seeks to understand the participants.
- The researcher listens with attention and empathy, •
- The participants speak with their own voice and tell personal stories •
- Focusses on patterns that can be recognized
- Identifies important categories in the data, as well as patterns and relationships, through the process of discovery
- Deals with data that is text, rather than numbers ٠
- Affords rich narrative descriptions •



5. Process to make the proposals

According to what has been stated in the previous section, policies emerge as a result of gaps that have been identified in previous IOs. Policy recommendations aim to resolve these gaps. In terms of partners' involvement in this process and timeline, University of Barcelona (P4) organised the work on this IO as follows:

- 1. Make a plan for IO9
- 2. Discuss the plan in online meetings
- 3. IO9 presentation and agreement on a date to receive partners' contributions (see template in Annex 1)
- 4. Collect partners' contributions
- 5. Analyse partners' contributions and release short policy report
- 6. Partners translate the policy recommendations into their local language
- 7. Partners produce videos and / or brochures with the policy recommendations
- 8. Deliver IO9

More specifically, the data collection process from collecting data at a national level until making the policy recommendations had four steps, namely: 1) Collect data, 2) Analyse data, 3) Write a first version of the proposals, and 4) Write the final version of the proposals as a result of obtaining feedback. The work carried out to complete each of these steps is reported as follows.

5.1. Step 1: Collect data

According to the plan presented by University of Barcelona (UB) and outlined above, the first step in data collection to inform policy design consisted in collecting partners' contributions. To that goal, partners were asked to complete 2 tasks:

Task 1: Analyse the reports already produced in previous IOs, especially IO2 (consultation with stakeholders), IO3 (development of climate change education materials) and IO5 (in-service teacher training on climate change education), looking for information that can be useful for policy development. More specifically, they sourced the following documents:

- Transnational report about face to face workshops outcomes (IO2)
- Results from the scenario voting (IO3)
- Results from task 5.3: 20-pages national reports on the training, and 20-pages transnational report (IO5)

As part of this task they were asked to organise the information in a spreadhseet that was made for each country. UB filled in the table before asking partners for their contribution so that they could have it as an example.

The spreadsheet consisted of a table with a system to organise the information in three dimensions of climate change education with IBL, gamification and digital tools, namely:

• Dimension 1: Student level: it refers to anything that has to do with how students experience climate change education with IBL, gamification and digital tools.



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- Dimension 2: Teacher level: it collects all the information regarding teachers' practice of climate change education with IBL, gamification and digital tools.
- Dimension 3: School-level: concerned with how schools can contribute to climate change education with IBL, gamification and digital tools.

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|-------------------------------|---------------------------------|--|--|--|--------|
| 2 + | fg. Dimensions of CO | Ed with IBL: gamif. | & dig. tools | | |
| 1.40 | | 4 | 0 | 36 | |
| | Dimensions of CCEd w | th IBL, gamif, & dig. to | als | | |
| Dimension | Category | Indicator | Sub-indicator | 102 | 102 |
| Dimension 1) | Curriculum | Competences | ACCOUNTS AND ADDRESS OF ADDRESS ADDRES | | 121-1 |
| Student-level | | Knowledge, skills, attitudes | Chinate change in general | | |
| | | | CC issues to be addressed in class | | |
| | Assessment | | | | |
| | Other > spicify | 12 E | | | |
| Dimension 2) Teacher-level | Teacher competences / skills | Content / Bisciplinary knowledge | CC Issues | | |
| | | Fedagogical | 8. | | |
| | | stowiedge | Ganification | | |
| | | | Other | | |
| | | Technological knowledge | Digital toos | | |
| | | Fedagogical Content Knowledge (PCK) | ISL for CC takues ISL + gamification for | | |
| | | Technological Pedagogical Content Knowledge (TPCK) | Digital tools for teaching CC teaces with ISL | | |
| | Taacters' attrudes / | Fears / resistances | Contraction of the local data | | |
| | perceptions | Strengths | | | |
| | Teacher education | Methodology | | | |
| | | Format: | | | |
| | Provider | | | | |
| | Citval × specify | | | | |
| Dimension 3) School-level | Within the school | Stedule / organisation | | | |
| | | Infrastructure Collaboration | | | |
| | | | Teacher-teacher | | |
| | | | Teacher - other | | |
| | Partnerships | school - school | | | |
| | networking | school - other | Educational | | |

Figure 1: Shared spreadsheet showing the system of dimensions, categories and indicators used to collect data

Dimension 1 includes two categories, namely "curriculum" and "Assessment", and the indicators and sub-indicators inside these categories include more detailed aspects of those that allow to grasp them in a more detailed way, such as knowledge about climate change itself, and climate change issues to be addressed in the classroom.

Dimension 2 is divided in three categories, dealing with teacher competences, teachers' attitudes or perceptions, and teacher education. Each of them is also divided in indicators and sub indicators. For instance, teacher competences is broken down into content / disciplinary knowledge, which has to do with knowledge of the subject matter they teach; pedagogical



knowledge, which refers to the strategies to facilitate learning; technological knowledge, which describes anything related to their use of digital tools; pedagogical content knowledge (PCK), dealing with the specific knowledge on how to teach a specific subject matter or content; and Technological Pedagogical Content Knowledge (TPCK), which refers to their knowledge on digital tools to teach that specific subject matter, in this case climate change issues.

Last, dimension 3 is divided into two categories, namely what can be done within the school, and outside the school (for instance establishing partnerships or collaboration with other institutions). As per what can be done inside the school, this category collects information regarding schedule and organisation, infrastructure issues, and teacher collaboration. Last, the partnerships that have been contemplated in the second category are with other schools, with families, or with other educational and non-educational institutions.

Whereas this is a deductive framework of analysis, where partners codify the information from their documents in these categories, an option was added in each level of hierarchy of this coding scheme (i.e. categories, indicators, and sub-indicators) in case partners found any information that was worth coding but had not been included in the scheme.

| Menue 6 | 1005 | 100% + 1 1 % | k, 29 m 0e6 | ul, • - [10] + B I ⊕ <u>A</u> ∳, ⊞ [] · | 〒+ F + H + F + co 田 田 ム 慶+ 2 |
|-------------------------------|--------------------------|-------------------------------------|---------------------------------------|--|--|
| · 1 /2 | | | | | |
| | 8. | £ | 0 | 1 | F |
| | | SPAIN | | | |
| | Dimensions of CC | Ed with IBL, gamil, & dig | j, topla | | |
| Dimension | Category | Indicator | Sob-Indicator | 102 | 107 |
| | Carlicolars | Competences | | | One of the two input isstell accession, i.e. Climate Summit, is based on students' considering different arguments and reaching agreement about CC douver - related to social and prior competitions. |
| | | Ksowiedge, skilt, attitudes | Climate change in general | | Teacters voted very highly a scenario about Climate Swimit, where students discuss and agree about measures that country can take to fight CC (not so much context-weated but some) prioritial) |
| | | | | CC education should be included in the cumpulant, through edding new specific contents | All scenarios scored high on "Bb to programms", therefore they pover curricular content from secondary school level |
| Dimension 1) Student-lovel | | | | Mastly content knowledge about the very phenomenon of climate charge. Ast also environmental adducator, health, climate justice, and social repositive adducated to CG such as climate inspection. Some elisit but modely attraves, even as ortical thrance. | |
| | | | | | |
| | | | CC Issues to be addressed in class | Farest free, food and sopply often, rise of femperatures. The serve CC issue can be approached as powerfife or as a social contains. | Marriy energy related |
| | Assessment | - | | | |
| | Other > specify | a constant and a second | in warmen | | |
| | Teacher compelances / | Content / dialipitnery knowledge | CC Iteases | Teachers should be trained about the facts and principles of slimate change | |
| | skills | Padegogical knowledge | (BL | Inguiny-based learning is an appropriate leaching methodology for CCEBI because it promotes an active role of students | Teachers say they are femiliar with (SL (and active learning methods) |
| | | 1000 million (1997) | Gaethiation | | Teachers say they are not very much used to gamification |
| | | | Other | CC education should be achieved through meaningful kerning experiences, where students are in the center of the learning process. | |
| | | | | Project-based learning Conforversies, Sociespentific seves, learn CC in sortext Service learning methodology | |
| | | Technological knowledge | Digital tuois | | |
| | | Padagogical Contant | IBL for CC basses. | | |

Figure 2: Example of spreadsheet filled in (Spain)

Therefore, 5 tables were collected, one per country (<u>link to tables here</u>). Additionally, partners were asked to write at least 3 assertions for each of the three dimensions of climate change education. For example, for Dimension 1 (student-level), assertion 1 could be "Climate Change Education (CCEd) should be included in the secondary school curriculum, as contents that are

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spread across different subjects". Assertion 2 could be formulated as follows "teachers should have more freedom to include CCEd in their lessons", whereas assertion 3 could be phrased as "Having more digital resources to collect data from the environment would help to promote and maintain CCEd".

Task 2 that partners were asked to complete consisted of identifying stakeholders who could be the receivers of the policies. Two types of stakeholders were requested, namely national-level, and supra-national level.

5.2. Step 2: Analyse Data

After the data was collected, UB analysed the data. The analysis had 3 steps, according to content analysis (Cohen, Manion, & Morrison, 2007; Lincoln & Guba, 1985): 1) Preparing the data; 2) Reading through the data, 3) Coding and analysing the data; and 4) Structuring narratives to describe the contents.



Figure 3: Data analysis process, as adapted from Cohen et al. (2007) and Lincoln & Guba (1985)

The results of the data analysis are presented in the following sub sections.

5.2.1. Results for dimension 1 (student- level)

Regarding all the aspects that concern how students experience Climate Change Education in school, the main result of analysing partners' contributions was the need to teach climate change issues across school subjects. Although the adequacy to teach these issues during the lessons of subjects belonging to Science, Technology, Engineering and Mathematics was mentioned, it appears that Climate Issues go beyond experimental sciences. For example, Spain reported that climate change education should be approached as part of student development of social and civic competence. Similarly, Bulgaria informed that "*Climate change problems are not addressed in social science disciplines - mainly the problems, concerning responsibility, impact, long-term commitment, personal and social perspectives are not discussed from philosophy, economic or more pragmatic social perspective"* (Spreadsheet_Bulgaria). Similarly, Turkey reports that climate change should be taught in the context of a pressing, social issue. It appears that in countries with a more interdisciplinary curriculum, climate change can be taught in a way that reflects its true nature in reality, this is, as a science-related issue that affects human parcels of decision-making that are not strictly scientific, such as economics, politics, or ethics.

A second result of this analysis was that climate change issues should be included in the curriculum. Climate change issues can be defined as facts or problems related to climate change, such as droughts, forest fires or energy sourcing and management. Greece, Spain and Germany report evidence stating that these topics are not given as much importance as they should in the curriculum, as they often appear anecdotally or as part of other, more established facts such as global warming or environmental education. It looks like teachers will pay more attention to



climate change education if they see that it holds a more prominent position in the curriculum and assessment standards.

Finally, Bulgaria and Germany report that according to the data they collected throughout the project, there are reasons to state that students lack important skills for understanding climate change issues, mostly discussion. Greece mentions the "Skills Workhshop 21+" initiative, which aims to help students develop soft skills that are believed to help them become more aware and proficient in fighting climate change.

5.2.2. Results for dimension 2 (teacher-level)

As per dimension 2, which has to do with teachers' practice of climate change education, three main results were found. First, all countries except for Germany agree that teachers lack knowledge about climate change in itself. Whereas Bulgaria and Spain focus on facts and principles about Climate change, Greece mentions environmental education, and Turkey argues that especially in-service teachers should know more about new problems that arise in the context of the climate crisis. According to Bulgaria, teachers also lack pedagogical knowledge, such as skills to facilitate discussion in class. In Germany's experience, the focus is rather on helping teachers develop skills to cooperate with others and network for climate change education.

Second, the issue about the conditions that teachers have to introduce climate change in their daily practice were raised. Greece stated that there is a lack of educational materials in this topic, and that textbooks, which many teachers use to plan lessons, may be outdated in this matter. Bulgaria, in turn, emphasized that teachers do not have time to plan lessons about climate change.

The last result at a teacher level concerns teacher education. All partners mention that any quality teacher education programme should include content about climate change. Germany stresses in particular the need for any higher education professor to undertake such training.

5.2.3. Results for dimension 3 (school- level)

After dimensions 1 and 2, the results from dimension 3 can be reported. This dimension is concerned with the reality of climate change education from the point of view of the school.

The main result is that climate change education at a school level must be approached in a double folded way: one, through its organisation, and another through its signs of identity. As per the first, Germany, Spain and Bulgaria agree that teachers should not deliver climate change education by themselves but in collaboration with other teachers, especially from other subjects. Bulgaria mentions specifically the problem of having a rigid schedule. As per the second aspect, the idea is to use the autonomy that schools have to incorporate climate change in its pedagogical statement, mission, values and /or yearly programme. Germany and Turkey in particular stress the suitability of a holistic approach "which includes teachers, the teaching staff, the school management as well as an extracurricular network" (Spreadsheet Germany); " Schools should aim for a holistic approach with extra-curricular stakeholders with the aim of continuously improving their teachers, teaching staff and school management" (Template Turkey).

Next, a common feeling was found among Germany, Spain and Greece's reports about the need to make schools environmentally conscious and committed as part of an overall strategy to



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achieve climate change education. This refers mainly to the energy consumption of the school building/s, but sometimes it refers also to including more green spaces to mitigate the heat, manage a vegetable patch, or even reconsider the providers of the school (transport, food etc.) in search of more sustainable options.

5.3. Step 3: Write a first version of the proposals

After the data was analysed, and based on the results reported above, a first version of the policy proposals was written. The basic principles of the policies applied were the following:

- Climate change education is a transversal phenomenon that takes place inside and outside formal education and that thus requires of the collaboration of different ... therefore policy recommendations address all these actors directly
- The policy proposals are based on strong empirical or research evidence, data from the field, especially international evidence from countries where policy has already been applied successfully
- Provide a good relation between its cost and its expected impact, it is feasible to apply considering that the global economic context: post-pandemic crisis, etc. may have made governments to prioritise investing resources in covering basic needs.
- Give options (advantages and disadvantages of each), to facilitate decision-making •
- Take into account what is already being done in this field
- Presented in clear, understandable language, as opposed to technical or research jargon, while still being professional
- Brief and informative, concise •
- Respond to policy makers' problems
- Practical and socially acceptable •

The first version of the policy proposals was shared with partners for feedback. As a result, corrections about wording were made, as well as organising the recommendations in three levels, namely: macro, meso, and micro.

5.4. Step 4: Write the final version of the proposals

At a later stage, University of Barcelona proceeded to validating the policy proposals with experts. To that goal, the policy proposals were sent to researchers and professors in the field of education, as well as a form to provide feedback about them. The form can be accessed on this link:

https://docs.google.com/forms/d/e/1FAIpQLSf5SGH1slxpunfJqxttd5v02jHCXnYP9x1h2DWp9LSj QiftuQ/viewform

A total of 4 responses were collected, with the following profiles: 4 people (75%) were researchers, and 1 person (25%) was a college professor. One of the main results of the evaluation is that five out of seven policy recommendations were rated as important or very important by all respondents. The policy recommendation to include climate change issues in the curriculum was rated as somewhat important by one participant, and the policy to develop a teachers' competence framework was rated as not very important by one participant.





On a scale from 1 to 5, rate the importance of each policy proposal

Figure 4: Results of the questionnaire item "Please rate the importance of these policy recommendations"

Moreover, half of the participants considered that the policies did not overlap each other or could be expressed as one. One participant said that involving families is related to including climate change in the school identity, whereas another participant said that developing a climate change education teacher competence framework overlaps all the other proposals. When asked to make suggestions to the policy recommendations, none of these experts had anything to add, except for one person who stated that instead of climate change, "climate crisis" should be used.

The results of the evaluation were taken into account to produce the final version of the policy proposals, which is provided in the present report.

6. Policy proposals

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This section presents the final version of the policy proposals, which comes as result of the policy proposals making process, as expressed in a set of 7 proposals. The proposals have been grouped in three levels, namely: a) micro, which includes actions within the school; b) meso, comprising domains that are between the school and the highest instances of decision-making; and c) macro, which includes government-level actions (local, regional, national, and supra-national).

| Policy proposal no. | Policy proposal | Level |
|---------------------|--|-------|
| 1 | Increase interdisciplinarity in the curriculum | Macro |
| 2 | Include Climate Change issues in the curriculum | Macro |
| 3 | Increase student skills for climate change education | Micro |
| 4 | Develop a climate change teaching competence framework | Meso |
| 5 | Promote exchange of educational practices | Meso |
| 6 | Include climate change education in school identity | Micro |
| 7 | Involve families in climate change education | Micro |

Table 1: Summary of policy proposals of ClimaTePD and their level of application

What follows is an explanation of each policy proposal in detail.

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6.1. Policy proposal 1: Increase interdisciplinarity in the curriculum

Description: Keep working in the direction of the curriculum changes made in most European state members in the last decades towards blurring the boundaries between subjects, especially in secondary school. Deepen the work in integrating STEM disciplines and consolidate the competence-based approach to basic education, which provides a more holistic way to achieve the goals of basic education as opposed to the discipline-bound way of teaching. Consolidate the work carried out towards increasing the connection between experimental and non-experimental disciplines in secondary school curriculum, as the scientific content is just one of the many components of climate change issues. Incorporate philosophy, ethics, geography, economics or politics into scientific disciplines, and consider including science-related issues in the contents of social or humanities-related subjects.

6.2. Policy proposal 2: Include Climate Change issues in the curriculum

Description: Include explicitly in the curriculum climate issues, for example belonging to one or more of these categories: weather and climate, atmosphere, water, energy, and plants and animals. Make it extensive to other, more recent issues affecting health, climate justice, and social inequalities associated to climate change such as climate migration.

Climate change issues can appear in the definition of student competences, learning objectives, contents, or assessment indicators.

6.3. Policy proposal 3: Increase student skills for climate change education

Description: Take actions that help students develop skills that are useful in climate change education, in particular regarding discussion. Climate change issues are not strictly scientific but have a strong social component. For this reason, these issues must be approached through analysis, discourse, argumentation or persuasion, among others. When students master these skills, the teaching will be most productive. These skills can be developed, among others, in subjects such as language, philosophy, social sciences, or ethics.

6.4. Policy proposal 4: Develop a climate change teaching competence framework

Description: Make the steps towards a professionalization of teachers' practice of climate change education, by developing a climate change teaching competence framework. Climate change teaching competences include but are not restricted to climate change competences. Instead, they describe competences that are specific for those who are facilitating others' learning about climate change.

The framework must cover three main areas of competence, namely: Area 1) Climate change issues in education; area 2) Pedagogical aspects of climate change education; and area 3) Professional development. Area 1 can be described as the set of facts and principles about climate change that are relevant for the level of education that is being taught. It does not cover all the knowledge about climate change as a subject matter, but what students must learn. This competence must include aspects such as environmental education, current problems about climate change, as well as being flexible enough to include new aspects that appear as part of the climate crisis. Area 2, in turn, is concerned with the ability to facilitate student learning of climate issues. It includes knowledge about student-centered methods, including project-based learning, inquiry-based learning, service learning or cooperative learning, as well as facilitating discussion,



argumentation and communication activities. Finally, area 3 describes teachers' skills to cooperate with others and network (teachers, families, educational and non-educational organisations) in order to keep improving the competence level.

The competence framework can be used to structure teacher education (preservice and in service), as well as to assess the current level of teachers' climate change education competence, and certify it in a standardized way.

6.5. Policy proposal 5: Promote exchange of educational practices

Description: Take advantage of the current, easy access to information on the Internet to promote exchange of climate change education practices among teachers. Seeing that publishers take time to release new educational materials, and that these are often expensive and closed, this policy is about encouraging teachers to document their climate change education practices and share them, and other teachers using them while crediting their authorship. This policy could address one of the specific challenges of climate change education (as opposed to other topics), which is the speed of change and the new challenges that appear.

Educational practices could be shared in existing, public or privately-funded repositories, national or supra-national. To that goal, teachers need time and motivation to do so.

6.6. Policy proposal 6: Include climate change education in school identity

Description: Incorporate climate change in decision-making stances of the school, such as department meetings, commissions, or management. Consider including it in the definition of the identity of the school, as expressed in its mission, values, curricular programme and rules of behaviour. Use a holistic approach, where all the personnel are included: management, staff, teachers, and the extracurricular network (families, service providers, etc.). Make the school itself an active agent to mitigate climate change, by continuously considering ways to be more energetically efficient, include more green spaces and work with sustainable service providers.

6.7. Policy proposal 7: Involve families in climate change education

Description: One of the pillars of the success of formal education, especially in secondary levels, is the co-responsibility from the families. Ensuring that families are aware and agree with the climate change education approach being carried out at school can strongly contribute to its success. To that goal, the school can communicate its approach about climate change education through the channels that families have access to: school website, social networks, instant messaging, etc. Families should also participate in students' learning process and / or attend any school event where these projects are showcased.

7. Dissemination of the proposals

One of the key aspects to achieve the goals of the policy recommendations is to disseminate them to key stakeholders. To that goal, an identification of stakeholders has been done, as well as the production of dissemination material in the form of bilingual brochures.



ClimaTePD:

"Towards a new model of Teachers' Professional Competence Development on Climate Change

7.1. Stakeholder identification

As part of IO9 University of Barcelona (UB) asked partners to identify key stakeholders in their countries, as well as channels at a supra-national level. Partners were given the following examples:

- 1. National or Regional governments: ministers, congressmen, parliamentary committees...
- 2. Local administrations: city or district council.
- 3. Climate change education companies, foundations or the educational departments of climate-related companies or research centers (private and public).
- 4. Social organisations, citizen movements, NGOs.
- 5. Climate change related locations (natural parks, animal reserves, etc.) and their professionals.
- 6. Educational community: families, non-formal education institutions.
- 7. In-service teacher training institutions.
- 8. General public

For each stakeholder, partners were asked to provide contact information or other ways to contact them, as it can be observed in Annex 2 of this document.

UB analysed partners' contributions and as a result a list of stakeholders was made. These are the receivers of the present document, as well as other products of this IO such as the brochure.

7.1.1. Micro level stakeholders

The stakeholders at this level act in the domain of the school. The main stakeholders mentioned in this level are school managers and families. School managers can be reached by email or even face to face visits, whereas families must be reached through contacting schools or family associations.

7.1.2. Meso level stakeholders

Stakeholders at the meso level act in domains that are between the school and the highest possible levels of decision making. Therefore, this category includes curriculum designers, teacher training providers, and others.

The most mentioned stakeholders at this level are local administrations and city councils. For example, in Spain Ms. Susana Navarro can be contacted, who is the Manager of STEM projects in the Education consortium of Barcelona. This Consortium constitutes a network of 5000 schools spread in an area of a million inhabitants. In Greece, the Education Centers for Environment and Sustainability (KEPEA) have been spotted as key (https://kpe.inedivim.gr/). These centers belong to a network of decentralised public educational structures of the Ministry of Education and Religious Affairs and they deal with Environmental Education and Sustainability. KEPEA Centers were established by the Law 1892/90 and the first centres started operating in Achaia in July 1993. The main goal of KEPEA is to highlight and promote issues based on three pillars: Environment, Society and Economy and to support CCESD at local, national and international level.

In some countries, citizen movements or organisations play a key role in disseminating the policy recommendations. This is a good strategy in the cases where climate change education is not a priority in the ministry of Education but it is mostly driven by organisations that are outside the official, public education system, but have an impact on it. In Greece, for example, The Greek Association of Teachers for Environmental Education (P.E.K.P.E.) has been spotted as an



important stakeholder. As Environmental Education is an open field for discussion and research, it brings together various theoretical fields, concerning both environmental and educational issues, while at the same time looking for new educational practices aimed at changing attitudes and behaviours, for a sustainable future. The ClimaTePD programme and the programme's results align with the description of the P.E.K.P.E. magazine. We could contact the editor of the magazine and publish an article about some of the results of the training programme such as the Good Practices handbook and the educational scenarios. Other non-governmental organisations have been selected as especially suited to receive the ClimaTePD policy recommendations, such as Arcturos, i.e. a non-profit, non-governmental, environmental organisation (NGO) focusing on the protection of wildlife fauna and natural habitat, in Greece and abroad, and the Hellenic Society for the Protection of Nature (HSPN), which has been at the forefront of efforts to establish national parks, to protect habitats and threatened species of fauna and flora, and to modernise and implement environmental legislation. This may also be the case for Turkey, which suggests to contact TEMA, The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats.

Other stakeholders at this level are those working on science communication and outreach: universities and research centers to communicate and disseminate the results of research about climate change so that the knowledge can be included in the curriculum or in classroom practice, and / or in specific educational innovations or interventions.

7.1.3. Macro-level stakeholders

Macro-level stakeholders act at the highest domains of decision-making. For the purposes of this IO, they have been divided in two sub-categories, namely national and supra-national.

National stakeholders are people who make decisions that impact the region or the country at the most. We believe that the ClimaTePD policy recommendations can be perceived as worth considering by stakeholders at this level, as they come as a result of a cross-country project, where the experience of different countries has been abstracted into higher-level conclusions.

More specifically, mostly governments will be contacted. The cost of contacting these stakeholders may be high, as depending on the country many steps must be followed to reach these high stances of governmental decision making. However, we believe that it is an effort worth making as the policies that are promoted by these stakeholders are either of compulsory compliance for schools or they are taken into account when making legally-binding decisions.

In Germany, a combination between national and regional-level government is the best for a successful dissemination of the policy recommendations given the federal nature of the country. At a National level, the Minister of Education Prof. Dr. Michael Piazolo has been identified as a key receiver of the ClimaTePD policy recommendations. At a regional level, some regions are prioritised because of its geographical proximity to FAU. The people identified are: Ms. Bettina Stark-Watzinger, from the Federal Minister for Education and Research; Mr. Markus Söder, Bavarian Prime Minister; and Ms. Martina Stamm-Fibich and Mr. Stefan Müller, members of the german parliament for Erlangen.

In Turkey the strategy to contact governments is based on reaching a balance between education and environment-related departments. Accordingly, the General Directorate of Teacher Training



and Development, the Ministry of Environment, Urbanisation and Climate Change, and the Ministry of Agriculture and Forestry (General Directorate of nature conservation and national parks) have been identified, as well as the ways to contact them.

In Spain: Minister of education Ms. Pilar Alegría Continente and the School council of the State.

Supra-national stakeholders are those who make decisions that may affect more than one country at a time. They are European, intercontinental or worldwide organisations whose opinion or reports are taken into account by states.

According to partners' contributions to IO9, the following supra-national stakeholders have been selected and classified in categories:

- General organisations: United Nations (UN),
- Science education organisations: Scientix, Foundation for Environmental Education (FEE),
- -Education organisations
- Environmental organisations: The European Climate Pact, Climate Generation, etc. -

Additionally, the Organizations for the dissemination of evidence can be used (Pellegrini & Vivanet, 2021): Centre for the Use of Research and Evidence in Education (CUREE; http://www.curee.co.uk/about-us), and Evidence-Based Teachers Network. The Evidence-Based Teachers Network (https://ebtn.org.uk).

7.2. Policy recommendations dissemination material

As a way to disseminate the policy recommendations, a brochure was made with key messages from the recommendations. First, an English version of the brochure was designed by University of Barcelona, which was shared with partners for feedback by email and in a meeting. A new version of the brochure was made incorporating this feedback, and circulated with partners again for final approval. The final version of the brochure is available in Appendix 3 of this document. When the final version of the brochure was decided, partners were asked to make bilingual versions of it (in English and in their local language).

8. Outcomes, Conclusions, and follow-ups

This IO has been useful to gain comprehensive insight into the current situation of climate change education with IBL, gamification and digital tools in Europe, and to produce evidence-based, valuable advice on this matter.

The policy proposals can be used to inform policy makers and other educational actors to take action to maintain and support climate change education in secondary school education. Curriculum developers may take them into account in forthcoming educational reforms. Preservice teacher training institutions may use this framework to design or evaluate their training programmes. Non-profit organisations or companies that run or want to run climate change education programmes could use the climate change teaching competences framework to select and / or evaluate their trainers.



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Annex 1: Template for partners

Dear partner,

Please send Annex 1 and Annex 2 filled in to Silvia Alcaraz (silvia.alcaraz@ub.edu) and/or upload it to the <u>Freedcamp folder</u> before **7th of May, 2023**.

Contextual information:

- ٠ The goal of IO9 is to develop a set of policy proposals focusing on a more holistic dimension of the inclusion of climate change education with IBL, gamification and digital teaching methods in secondary education.
- This is our last IO in this project. You'll be working with reports that you have already written.
- For more information about IO9, see the presentation from Fürth Meeting.

Workflow for IO9:

- 1. Partners fill in the template provided by UB by 7th of May, 2023
- 2. UB collects the information and drafts a set of policy proposals (in English) by 30th of May, 2023
- 3. Partners draft a set of policy proposals in their National language (Greek, Bulgarian, German, Spanish and Turkish) by 15th of June
- 4. Partners draft a bilingual brochure with "key-messages" resulted from the set of policy proposals (both in English and in the respective language of each partner-country), for dissemination and exploitation purposes by 10th of July, 2023
- 5. FORTH hosts the Multiplier Event E11 on 11 or 12th of July in Heraklion, Crete.

Feel like being in company to work on this task?

Join the IO9 zoom writing sessions every Tuesday at 10:30 CET:

https://ub-edu.zoom.us/i/98273462172?pwd=OEpKTDI3aGdXc1VsekU1dGNDMnN6dz09

Meeting ID: 982 7346 2172 --- Code: 601883

Any other questions or comments?

Write an email to silvia.alcaraz@ub.edu and we will do our best.

We look forward to receiving your contributions!



ASSERTIONS FOR POLICY PROPOSALS

INSTRUCTIONS

- 1. Go to your freedcamp folder:
 - a. <u>Bulgaria</u>
 - b. Germany
 - c. <u>Greece</u>
 - d. Turkey
- 2. In this folder you will find reports that you have already written:
 - IO2: Report on the outcomes derived from the two-days workshop for the challenges in climate change education when using IBL, gamification and digital teaching methods
 - IO3: National reports for scenario selection
 - If you did it already: IO7: Multiplier events E6-E10
- 3. Read through these documents and find information belonging to the requested categories and indicators, and copy-paste it in the tab of your country in <u>this spreadsheet</u>.
- 4. Write on the tables below at least three (3) assertions for each category, based on the spreadsheet you just filled in. Our policy proposals will be based on these assertions.

Tip: Be as precise as possible. This is our last chance to make a contribution to Climate Change Education as a result of our learnings from this project!

ASSERTIONS

Dimension 1: Student level

For example: Climate Change Education (CCEd) should be included in the secondary school curriculum, as contents that are spread across different subjects; teachers should have more freedom to include CCEd in their lessons; Having more digital resources to collect data from the environment would help to promote and maintain CCEd.

Assertion 1

Assertion 2

Assertion 3

(add more if needed)

Dimension 2: Teacher level

For example: *IBL* is a good support for CCEd because it is mostly science teachers who do it and they are familiar with this instructional method; CCEd should be part of teachers' initial training; Teachers need to the able to manage discussions in class because Climate Change issues are often controversial.



Assertion 1

Assertion 2

Assertion 3

(add more if needed)

Dimension 3: School level

For example: The school infrastructure is a restriction to introducing gamification elements such as digital badges because these require an online environment (Moodle, others) to host and deliver those badges; The school manager/s must support CCEd for it to be a reality, mainly through allowing more time for teaching certain subjects.

Assertion 1

Assertion 2

Assertion 3

(add more if needed)

STAKEHOLDERS

INSTRUCTIONS

Please fill in the information about 5-10 national/regional stakeholders and 3-5 supranational stakeholders.

What is a stakeholder: The receiver of the policy proposals that will be formulated in IO9. Normally, stakeholders are people who make decisions in an area, who have an influence because of their role in an institution or in a society. These people will be the receivers of our recommendations about climate change education in secondary school. Some ideas of stakeholders:

- 9. National or Regional governments: ministers, congressmen, parliamentary committees...
- 10. Local administrations: city or district council
- 11. Climate change education companies, foundations or the educational departments of climate-related companies or research centers (private and public).
- 12. Social organisations, citizen movements, NGOs.
- 13. Climate change related physical locations (natural parks, animal reserves, etc.) and their professionals.
- 14. Educational community: families, non-formal education institutions.
- 15. In-service teacher training institutions.
- 16. General public

LIST OF STAKEHOLDERS

1. National / regional stakeholders



| Stakeholder 1: Name |
|--------------------------------------|
| Website / Profile in social networks |
| Туре |
| |
| Description |
| |
| |
| Strategy to reach them |
| |
| |

| Stakeholder 2: Name | | |
|--------------------------------------|--|--|
| Туре | | |
| Website / Profile in social networks | | |
| | | |
| Description | | |
| | | |
| | | |
| Strategy to reach them | | |
| | | |
| | | |

| Stakeholder | 3: Name |
|-------------|---------|
| | |

Туре

Website / Profile in social networks

Description

Strategy to reach them



ClimaTePD:

"Towards a new model of Teachers' Professional Competence Development on Climate Change

(Copy and paste more tables if needed)

2. Supra-national stakeholders

Stakeholder 1: Name

Туре

Website / Profile in social networks

Description

Strategy to reach them

| Stakeholder 2: Name |
|--------------------------------------|
| Туре |
| Website / Profile in social networks |
| |
| Description |
| |
| |
| Strategy to reach them |
| |
| |

| Stakeholder 3: Name |
|--------------------------------------|
| Туре |
| Website / Profile in social networks |
| |
| Description |
| |
| |
| Strategy to reach them |



(Copy and paste more tables if needed)

Add here any other means of disseminating the policy recommendations that you can think of:



Annex 2: Partners' contributions

2.1. Greece

ASSERTIONS

Dimension 1: Student level

Assertion 1

Very recently, the Ministry of Education and Religious Affairs in collaboration with the Institute of Educational Policy (IEP), introduced the "Skills Workshops 21+", in all levels of the Greek school (kindergarten, primary and secondary education) for the year 2021-2022. As a dynamic and educational action, the "Skills Workshops 21+" include modern and innovative learning methods with a special reference and a whole section on environment (Ecology - World and local Natural heritage - Climate change - Natural disasters, Civil protection - World and local cultural heritage). The aim of these workshops is to enhance the cultivation of mild skills, life and technology skills as well as science skills in all students, in the frame of a new and up to date curriculum framework.

Assertion 2

Environmental literacy, digital literacy and language literacy need to be combined and have a strict orientation when it comes to education and lifelong learning. Having a better infrastructure at schools such as computer classes, would help teachers include CCESD topics in secondary school subjects.

Assertion 3

There is an overall lack of the climate change thematic in all subjects and especially in STEM subjects at secondary school and beyond. There are also issues with open access data and educational material, as well as with the content of the school books which is not updated.

Dimension 2: Teacher level

Assertion 1

Teachers' need for high quality training programmes on climate change education is more than important. Teachers have high responsibility and at the same time a unique opportunity to inspire their students to become environmentally aware and adopt behavioural changes for more sustainable lifestyles. As teachers hold a key role regarding CCESD, it is also crucial to be as prepared as possible for teaching climate change and environmental education in the best way.

Assertion 2

Training in environmental education issues has played a positive role in changing educators' attitudes, enhancing their cognitive frame and developing their metacognitive skills. This was expressed by their nature-based interests, and their creativity in teaching and implementing environmental programmes.

Assertion 3

It is imperative to re-evaluate the objectives of the Decade of Education for Sustainable Development 2005-2014 (ESD-Decade) and offer to the teachers a training based on the correlation between the ecological issues and the climate crisis in order to help them follow a more interdisciplinary way in their teaching.



Dimension 3: School level

Assertion 1

The environmental programmes implemented in Greek schools in many areas in Greece showcase a significant increase and according to the Ministry of Education and Religious Affairs, there are approximately 2,100 environmental programmes per year implemented in secondary education, with a time reference around 2002. As the number of the environmental programmes implemented in the Greek schools has increased more and more teachers and students participate in these programmes.

Assertion 2

STEM subjects that could easily integrate some environmental references in their chapters in order to approach climate change education need to have extra teaching hours in the school curriculum. It is necessary to vaccinate the school's curriculum with concepts that refer to and analyse issues related to the environmental crisis, such as the biodiversity loss which affects everyone on the planet.

Assertion 3

Environmental education is not a compulsory subject at school for many European countries, including Greece. Courses that are directly related to Ecology have been either removed from the Greek secondary schools curriculum or remained only as small chapters in other subjects. In Greece, Climate Change Education for Sustainable Development (CCESD) should be at the top of the agenda in the development of new school curricula both in secondary and primary education, as possible scenarios after COVID-19 demonstrate that human societies will suffer new pandemics in the future.

LIST OF STAKEHOLDERS

1. National / regional stakeholders

| | / 6 | | | | | |
|-------------------------|---------|-------------|--------------|------------|--------------|---------------------------------|
| Stakeholde | er 1: I | Education (| Center | for Enviro | nment and Su | ıstainability |
| Website | / | Profile | in | social | networks: | <u>https://kpe.inedivim.gr/</u> |
| https://ww | ww.fa | cebook.cor | <u>n/kpe</u> | .inedivim | | |
| Type: Education Centers | | | | | | |
| | | | | | | |
| D | | | | | | |

Description

The Education Centers for Environment and Sustainability (KEPEA) (https://kpe.inedivim.gr/) belong to a network of decentralised public educational structures of the Ministry of Education and Religious Affairs and they deal with Environmental Education and Sustainability. KEPEA Centers were established by the Law 1892/90 and the first centres started operating in Achaia in July 1993. The main goal of KEPEA is to highlight and promote issues based on three pillars: Environment, Society and Economy and to support CCESD at local, national and international level.

Strategy to reach them

There are many KEPEA Centers in different areas around Greece that we could easily contact. KEPEA Centers conduct training programmes and seminars for both primary and secondary school teachers. They could include the results of the ClimaTepD programme as well as the Good Practices Guideline Handbook in their seminars in order to help and support teachers that want to include climate change education in their subjects at school.

Moreover, KEPEA could present the ClimaTePD training programme on their website for teachers that want to participate in the training which will be open, free and available for all teachers during and after the project lifetime.

| Stakeholder 2: The University of Crete Research Center for the Humanities, the Social and | | |
|--|--|--|
| Education Sciences - Laboratory of Pedagogical Research and Applications (LabERA) and | | |
| -Science Teaching Laboratory | | |
| Type: Research Center | | |
| Website/Profileinsocialnetworks: | | |
| https://keme.uoc.gr/index.php/en/laboratories/school-of-education/laboratory-of- | | |
| pedagogical-research-and-applications | | |
| Description | | |
| - The aim of LabERA is to meet the academic and research needs in the subject of Education and related areas of Educational Sciences. Specifically, the LabERA aims to the development of Curriculum studies Teaching methods Psychoeducational measurement tools for the assessment of students and educational settings Educational tools for promoting various areas of child development (verbal, psychomotor, logico-mathematical knowledge, artistic, musical, theatrical). | | |
| - The Laboratory for the Teaching of Sciences aims to: a) train undergraduate and postgraduate students on science teaching by familiarizing them with the experimental process and supporting their practicum in schools b) conduct research on science education and especially on the following disciplines: Mathematics in Education, Science Education, ICT in Education, Environmental Education c) promote the cooperation among diverse stakeholders in order to reinforce the relationship between science and society. | | |
| Strategy to reach them | | |
| We could suggest a meeting with these two Laboratories in order to present the | | |
| ClimaTePD training programme and the results we have collected. A meeting with the | | |
| researchers of these two Laboratories could potentially lead to new research | | |
| programmes about now we can include CCESD in primary schools in Greece. | | |
| | | |
| Stakeholder 3: University Departments of Education and Departments of Physical and Social Sciences | | |
| Type: University Departments i.e. University of Crete (Department of Physics, | | |
| Department of Biology, Department of Chemistry, Department of Material Science and | | |
| Technology, Department of Mathematics & Applied Mathematics, Department of | | |
| Sociology, Department of Psychology, Department of Political Sciences, Department of | | |
| Education, etc.) | | |
| website / Profile in social networks: <u>https://en.uoc.gr/</u> , | | |
| https://www.ldcbbbok.com/chappel/IIC5KEcD00JuDogclVV7VCpCg | | |
| https://www.ipstagram.com/uocrete/ | | |
| https://www.linkedin.com/company/%CF%80%CE%B1%CE%BD%CE%B5%CF%80 | | |
| %CE%B9%CF%83%CF%84%CE%AE%CE%BC%CE%B9%CE%BF- | | |



<u>%CE%BA%CF%81%CE%AE%CF%84%CE%B7%CF%82---university-of-crete/</u>, https://twitter.com/UOC gr

Description

Established in 1973, the University of Crete is a young public educational institution sited in a region rich in ancient and modern Mediterranean cultures. Currently around 20,000 undergraduate and graduate students study here through the Schools of Philosophy, Education, Social Sciences, Sciences & Technology, and Medicine, taught by an outward looking academic staff committed to quality in teaching, research, and community partnerships.

Strategy to reach them

There are many University Departments of Education and Departments of Physical and Social Sciences in many cities in Greece. We present herein the University of Crete as an example. ClimaTePD results could be used to inform students about CCESD and the teaching methodologies that we have included in the ClimaTePD training. Students could also participate in the training as it is online and asynchronous with helpful educational material and information regarding climate change education for sustainable development and how to teach it.

Stakeholder 4: The Greek Association of Teachers for Environmental Education (P.E.K.P.E.)

Type: Teachers Association

| Website | / | Profile | in | social | networks: | <u>https://peekpe.gr/</u> , |
|-------------|-------|--------------------|-------|--------|-----------|-----------------------------|
| https://www | w.pee | <u>kpemagazine</u> | e.gr/ | | | |

Description

The Greek Association of Teachers for Environmental Education, P.E.K.P.E. was founded in 1992. P.E.K.P.E. is a scientific, non-profit association of teachers of all levels, which aims at strengthening and promoting Environmental Education in every possible way. Some of the key goals of P.E.K.P.E. are to promote the communication and cooperation between teachers involved in Environmental Education and the exchange of information and experiences between Greek and foreign teachers.

Strategy to reach them

(1: mesteP)

P.E.K.P.E. publishes an online magazine about Environmental Education. As Environmental Education is an open field for discussion and research, it brings together various theoretical fields, concerning both environmental and educational issues, while at the same time looking for new educational practices aimed at changing attitudes and behaviours, for a sustainable future. The ClimaTePD programme and the programme's results align with the description of the P.E.K.P.E. magazine. We could contact the editor of the magazine and publish an article about some of the results of the training programme such as the Good Practices handbook and the educational scenarios.

| Stakeholder 5: | Arcturos | | | | | | |
|---|-------------|---------------|---|--------|-----------|--|--|
| Type: NGO | | | | | | | |
| Website | / | Profile | in | social | networks: | | |
| https://www.arcturos.gr/en/activities/environmental-education/, | | | | | | | |
| https://www.facebook.com/arcturosngo, | | | https://twitter.com/arcturosngo, | | | | |
| https://www. | youtube.com | m/arcturosgr, | https://www.instagram.com/arcturosngo/, | | | | |
| https://gr.pinterest.com/arcturos/ | | | | | | | |

Description

Arcturos is a non-profit, non-governmental, environmental organisation (NGO) founded in 1992, focusing on the protection of wildlife fauna and natural habitat, in Greece and abroad. The foundation of Arcturos was driven by the constant need to solve the problem of bear and wolf's imprisonment. Since 1995, Arcturos has been successfully carrying out activities about environmental education in institutions of primary and secondary education, with the approval of the Ministry of Education and Religious Affairs. Each year, around 100.000 students of primary and secondary schools are being educated and trained by the specialised educational team of Arcturos, which carries out the projects in the regions of Attica and Thessaloniki as well as other regions nearby.

Strategy to reach them

Arcturos education team organises many educational projects at schools and online. We could contact the education team and suggest the online publication of the Good Practices Guideline Handbook that it could be useful for teachers that include CCESD in their subjects at school.

Stakeholder 6: Hellenic Society for the Protection of Nature (HSPN)

Type: NGO

Website / Profile in social networks:

https://www.eepf.gr/en/

https://twitter.com/GreekNature

https://www.facebook.com/ProstasiaTisFysis

https://www.instagram.com/hspn_protection_of_nature/?utm_medium=copy_link&fbcl id=IwAR1qWpJnpkx9WuSnjss2xi b1YyEiqG3lh5ay0wfWj-RLLnvnIt2rSaVOHI

https://www.youtube.com/user/eepfgr

Description

The Hellenic Society for the Protection of Nature (HSPN) is the oldest national environmental NGO in Greece, operating continuously since 1951 throughout the country for the protection of nature. From its very inception it has been at the forefront of efforts to establish national parks, to protect habitats and threatened species of fauna and flora, and to modernise and implement environmental legislation.

HSPN works with many other NGOs for common goals, and cooperates with many national and regional state agencies. For its work it has received awards from the Academy of Athens, the Council of Europe and the Ford Foundation. Today, the HSPN is active in 4 main areas: Environmental Intervention; Conservation and Nature Protection; Environmental Education; Sustainable Management and Public Awareness Raising.

Strategy to reach them

HSPN could be another NGO that we could contact in order to post online our ClimaTePD Good Practices Guideline Handbook.

2. Supra-national stakeholders

| Stakeholder 1: United Nations (UN) | | | | | | | |
|---|---|---------|----|--------|-----------|-------------------------|--|
| Type: international organization | | | | | | | |
| Website | / | Profile | in | social | networks: | https://www.un.org/en/, | |
| https://www.facebook.com/unitednations, https://twitter.com/u | | | | | | | |
| https://www.youtube.com/unitednations, | | | | | | | |



https://www.instagram.com/unitednations/,

https://www.flickr.com/photos/un_photo/

Description

The United Nations is an international organization founded in 1945. Currently made up of 193 <u>Member States</u>, the <u>UN and its work</u> are guided by the purposes and principles contained in its founding Charter.

The UN has evolved over the years to keep pace with a rapidly changing world. But one thing has stayed the same: it remains the one place on Earth where all the world's nations can gather together, discuss common problems, and find shared solutions that benefit all of humanity.

Strategy to reach them

We could contact the regional office of the UN in Greece and inform them about the ClimaTePD programme and the policy proposal that we have produced. As there is a special section on the website for school actions and information for teachers and students (under the 17 SDGs) we could suggest adding on their website the policy proposals and the Good Practices Guideline Handbook as useful tools for teachers that teach climate change education for sustainable development.

Stakeholder 2: Scientix

Type: Science Education community

Website / Profile in social networks: <u>https://www.scientix.eu/home,</u> <u>https://www.facebook.com/groups/1453890754824661/</u>,

https://twitter.com/scientix_eu

Description

Scientix is the number one community for science education in Europe. It aims to promote and support a Europe-wide collaboration among STEM teachers, education researchers, policymakers and other educational stakeholders to inspire students to pursue careers in the field of Science, Technology, Engineering and Mathematics (STEM).

Strategy to reach them

ClimaTePD programme participates in the STEM Discovery Campaign 2023 organised by Scientix. In addition, the first results of the ClimaTePD teachers training have been presented in the 4th SCIENTIX CONFERENCE (18-19 of November 2022). Scientix could give visibility to our project results and be a way to facilitate the CCESD inclusion in schools curricula in Greece and beyond.

Stakeholder 3: Foundation for Environmental Education (FEE)

Type: Education organisation

Website / Profile in social networks: <u>https://www.fee.global/</u>

https://www.facebook.com/fee.global/, https://www.instagram.com/fee_global/, https://twitter.com/FEEInt,

https://www.youtube.com/channel/UCrWsoSM7d_VJYBLNPbNH8tg

Description

Established in 1981, the Foundation for Environmental Education (FEE) is one of the world's largest environmental education organisations, with over 100 member organisations in 81 countries. With 40 years of impactful experience in ESD, our new strategic plan - GAIA 20:30 - prioritises climate action across all five programmes to address the urgent threats of climate change, biodiversity loss and environmental pollution.

Our educational programmes, Eco-Schools, Learning About Forests and Young Reporters for the Environment, empower young people to create an environmentally conscious world through a solutions-based approach. Our Green Key and Blue Flag programmes are globally recognized for promoting sustainable business practices and the protection of natural resources.

Strategy to reach them

The ClimaTePD programme could gain visibility through the FEE website.

Stakeholder 4: The European Climate Pact

Type: movement

Website / Profile in social networks: https://climate-pact.europa.eu/index_en Description

The European Climate Pact is a movement of people united around a common cause, each taking steps in their own worlds to build a more sustainable Europe. Launched by the European Commission, the Pact is part of the European Green Deal and is helping the EU to meet its goal to become climate-neutral by 2050.

Everyone has a place in the Pact. You can get involved whether you are just starting out on your climate action journey or already working to make a difference in your world. You can take part as an individual or as an organisation – for example, a city, a community or an association.

Strategy to reach them

ClimaTePD could be part of the European Climate Pact as an ambassador.

Stakeholder 5: Climate Generation

Type: Organisation

networks: Website Profile https://climategen.org/ / in social https://twitter.com/climategenorg, https://www.instagram.com/climategenorg/, https://www.youtube.com/climategenorg, https://www.facebook.com/climategen Description

Climate Generation ignites and sustains the ability of educators, youth, and communities to act on systems perpetuating the climate crisis.

Since 2006, Climate Generation has been building climate literacy, amplifying personal connections to climate change, and developing powerful advocates amongst educators, vouth, and communities through a model of collaboration and partnership.

Strategy to reach them

The ClimaTePD programme could gain visibility through the Climate Generation website.



2.2. Spain

ASSERTIONS

Dimension 1: Student level

Assertion 1

CC education should be included in the curriculum, through adding new, specific contents.

Assertion 2

Climate Change issues should be addressed in class from a social, humanistic, citizenship competence point of view.

Assertion 3

Some climate change issues to be addressed in class are: Forest fires, energy consumption, food supply chain, rise of temperatures (mostly things that can have an impact in students' daily life)

Dimension 2: Teacher level

Assertion 1

Teachers should receive training about the facts and principles of climate change

Assertion 2

CC education should be achieved through meaningful learning experiences, where students are in the center of the learning process.

Assertion 3

Teachers should learn about CC through active methodologies, and as part of a network that includes other teachers and CC organisations such as research institutes and NGOs

Dimension 3: School level

Assertion 1

CC contents to be distributed across the subjects in secondary school, as opposed to a separate course on CC, *CC education should be transversal and interdisciplinary.*

Assertion 2

It is essential that CC education takes place in collaboration with other organisations, ideally those being environmental associations that are tackling one or more CC problems.

Assertion 3

The IT infrastructure of most schools in Spain allows for using digital tools for CCEd., as all classrooms have a computer and a beamer and most students have their own laptop thanks to an institutional policy.



"Towards a new model of Teachers' Professional Competence Development on Climate Change

LIST OF STAKEHOLDERS

1. National / regional stakeholders

Stakeholder 1: Susana Navarro

Website / Profile in social networks

Type: Local administrations: city or district council

Description

Manager of STEM projects in the Education consortium of Barcelona.

Strategy to reach them

Email

Stakeholder 2: *Pilar Alegría Continente*

Type:

Website / Profile in social networks

https://www.educacionyfp.gob.es/ministerio/organigrama/ministra.html

Description

Minister of Education

Strategy to reach them

Stakeholder 3: School council of the State

Type:

Website / Profile in social networks

https://www.educacionyfp.gob.es/mc/cee/portada.html

Description

Participation organism of all the sectors related to Education

Strategy to reach them

- Email <u>c.escolar@mecd.es</u>
- Email: <u>c.escolar@mecd.es</u>

(Copy and paste more tables if needed)

2. Supra-national stakeholders



Stakeholder 1: Scientix

Type: Association

Website / Profile in social networks

https://www.scientix.eu/

Description

Community for science education in Europe. It aims to promote and support a Europewide collaboration among STEM teachers, education researchers, policymakers and other educational stakeholders to inspire students to pursue careers in the field of Science, Technology, Engineering and Mathematics (STEM).

Strategy to reach them

Social networks or contact form.

Stakeholder 2: European Education Area

Type: Governmental organisation

Website / Profile in social networks

https://education.ec.europa.eu/

Description

The European Education Area fosters collaboration among European Union Member States to build more resilient and inclusive national education and training systems.

Strategy to reach them

Submit ClimaTePD Guidelines Handbook or policy recommendations to the section "documents" of the website: https://education.ec.europa.eu/resources-and-tools/documents?

Stakeholder 3: *Education for Climate Coalition*

Type: Community

Website / Profile in social networks

https://education-for-climate.ec.europa.eu/community/

Description

The Education for Climate Coalition is the European participatory community to support teaching and learning for the green transition and sustainable development. As a flagship initiative of the European Education Area by 2025 and essential part of the European Green Deal the Education for Climate Coalition is part of the European Union's comprehensive approach to environmental sustainability education.

As a community of practice, it enriches both the Council recommendation on environmental sustainability and the competence framework on sustainability with its



"Towards a new model of Teachers' Professional Competence Development on Climate Change

participatory approach for taking action on education for climate challenges on the ground.

Strategy to reach them

Create a profile, join a group and contribute with the policy recommendations.

2.3. Germany

ASSERTIONS

Dimension 1: Student level

Assertion 1: Students in Germany would like to see more ESD in schools

Assertion 2: CC issues should be more addressed in class

Assertion 3: Climate change plays an important role in student's life

Assertion 4: Strengthen student's ability to reflect facts, data and sources concerning climate change

Dimension 2: Teacher level

Assertion 1: Further training in ESD should be compulsory for lecturers at universities

Assertion 2: ESD must already be an integral part of the studies and training of future teachers

Assertion 3: All teacher training courses should be expanded with at least one module on ESD

Assertion 4: ESD should not be understood only as a task of individual teachers

Assertion 5: Cooperation competence and networked thinking as important skills

Dimension 3: School level

Assertion 1: It is necessary to establish a person responsible for ESD at each school

Assertion 2: It is important that teachers and school administrators are given enough space by the policy makers to develop themselves in the field of ESD

Assertion 3: A holistic approach in terms of school development, which includes teachers, the teaching staff, the school management as well as an extracurricular network should be targeted

Assertion 4: A school-transformation-process is needed instead of a school-development

Assertion 5: Long-term funding is crucial for the extracurricular partners

LIST OF STAKEHOLDERS

1. National / regional stakeholders

Stakeholder 1: Minister of Education Prof. Dr. Michael Piazolo



| Website | / | Profile | in | social | networks: | https://www.michael-piazolo.de, |
|------------|------|------------------|------|--------------------|---------------|--------------------------------------|
| https://ww | ww.] | <u>km.bayern</u> | de/n | <u>ninisteriun</u> | n/minister-fu | <u>er-unterricht-und-kultus.html</u> |
| | | | | | | |

Туре

Minister of Education of the State of Bavaria

Description

Member of the Bavarian State Parliament, Minister of Education, sets educational standards, conservative

Strategy to reach them

Direct contact via the form on his website and the well-established contact between the FAU and the Bavarian government or indirectly via the Bavarian Ministry of Education and Cultural Affairs

Stakeholder 2: Bettina Stark-Watzinger

Type: Federal Minister for Education and Research

Website / Profile in social networks

https://www.bundesregierung.de/breg-de/bundesregierung/bundeskabinett/bettinastark-watzinger-1974178, https://www.bmbf.de/bmbf/de/ueber-uns/die-leitung-deshauses/bettina-stark-watzinger/bettina-stark-watzinger.html, https://www.starkwatzinger.de, https://www.bmbf.de/bmbf/de/bildung/bildung-fuer-nachhaltigeentwicklung/bildung-fuer-nachhaltige-entwicklung node.html

Description

Federal Minister of Education and Research, member of the FDP (liberal), responsible for education issues at the federal level (school issues nevertheless a matter for the states)

Strategy to reach them

Direct contact via own website or indirectly via the Ministry of Education or the $\underline{\sf BNE}$ Website of the ministry

Stakeholder 3: Markus Söder

Type: Bavarian Prime Minister

Website / Profile in social networks

<u>https://www.instagram.com/markus.soeder/?hl=de</u>, https://www.bayern.de/staatsregierung/ministerpraesident/

Description

Bavarian prime minister, leads the Bavarian state government, conservative policy

Strategy to reach them

the form Bavarian Direct contact via on the state portal at https://www.bayern.de/staatsregierung/ministerpraesident/kontaktformularministerpraesident-soeder/ or possibly by means of his Instagram account or a request to the state government

Stakeholder 4: Martina Stamm-Fibich

Type: Member of the german parliament for Erlangen

Website / Profile in social networks

https://stamm-fibich.de.

https://www.bundestag.de/abgeordnete/biografien/S/stamm-fibich_martina-858054, https://www.instagram.com/martina.stammfibich.mdb/?hl=de

Description

Member of the German Bundestag for the city of Erlangen and the SPD, social democratic politics in the foreground, particularly involved in the topic of pharmaceuticals and health

Strategy to reach them

Contact via their website and the deposited email address or possibly via Instagram

Stakeholder 5: Stefan Müller

Type: Member of the German parliament for Erlangen

Website / Profile in social networks

https://www.stefanmueller.com,

https://twitter.com/smuellermdb?ref src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctw gr%5Eauthor, https://www.csu.de/partei/vorstand/kooptierte/stefan-mueller/

Description

December 2013 to October 2017 Parliamentary State Secretary to the Federal Minister of Education and Research, member of the Board of Trustees of Friedrich-Alexander University Erlangen-Nuremberg, conservative politics

Strategy to reach them

Contact via your own website, the FAU Board of Trustees or Twitter

2. Supra-national stakeholders

Stakeholder 1: European Education Policy Network

Type: European Association

Website / Profile in social networks



https://educationpolicynetwork.eu/

Description

The European Education Policy Network on Teachers and School Leaders is a Europewide network of relevant organisations (policymakers, practitioners, researchers and stakeholders) to promote co-operation, policy development and implementation at different governance levels, and to support the European Commission's policy work on teachers and school leaders.

Strategy to reach them

Visit website and contact suitable partners

Stakeholder 2: European School Heads Organisation (ESHA)

Type: NGO

Website / Profile in social networks

https://www.esha.org

Description

ESHA, the European School Heads Association, is a professional organization for European School Heads. Members of ESHA are national organisations for school heads and deputy school heads within (pre-) primary, secondary and vocational education. Nearly all European countries (both EU and non-EU) are represented within ESHA by one or more organisations.

ESHA is an international community in which experiences, visions and views between members are exchanged and in which new ideas are born. ESHA connects school leaders, researchers and policy makers with the collective aim to learn from each other and improve education.

Strategy to reach them

Contact via their <u>deposited email-addresses</u>

Stakeholder 3: European Educational Research Association

Type: NGO (german: "Verein")

Website / Profile in social networks

https://eera-ecer.de

Description

The aim of the 'European Educational Research Association' (EERA) is to further high quality educational research for the benefit of education and society. High quality research not only acknowledges its own context but also recognises wider, transnational contexts with their social, cultural and political similarities and differences.



"Towards a new model of Teachers' Professional Competence Development on Climate Change

Strategy to reach them

Contact through the various possibilities that can be found in the \underline{link}



2.4. Bulgaria

ASSERTIONS

Dimension 1: Student level

Assertion 1

It was identified that Bulgarian teachers do not share a common understanding about the climate change issues and are not familiar how to present and discuss these problems with students in class. The questions about climate change are dispersed among different disciplines (Biology, Geography, Chemistry etc.) and usually are covered in several lessons, not making connections between the subjects and between the local and global perspectives.

Assertion 2

Bulgarian teachers and students claim that climate change issues are not covered well in the traditional school curriculum. The participants of the ClimaTEPD course activities stated that Climate Change problems are usually presented in a "boring" way in the school programs. Most of the teachers report that there lack specific exercises or activities for discussions, debates and active learning, where students can actively look for specific solutions and actions, that can deal with the CC problems. Furthermore, students rarely have the opportunity to work on interdisciplinary projects for discussing Climate change complexity and to identify the different aspects of the CC problems. Assertion 3

Actually, in Bulgarian school programs, climate change problems are not addressed in social science disciplines. Students do not recognize some important climate change issues, covering for example the personal and the community responsibility, the impact, the role of the long-term commitment, personal and social perspectives and others. Specific topics can be addressed in social science subjects such as philosophy, economy or citizen education, or other. Specific issues can be addressed as well in a more pragmatic social perspective for example in the curriculum of the discipline entrepreneurship and technologies.

Dimension 2: Teacher level

Assertion 1

Teachers commonly report that the school programs do not provide them the opportunity to organize more time-consuming student-oriented activities. They complained that they do not have enough time in class for covering in a proper way some complex issues such as climate change problems. The school lessons cover a lot of fact-based theoretical presentations, while students need more practical examples and local practices.

Assertion 2

IBL and active learning methods are not very popular among Bulgarian teachers. However, after the ClimaTEPD training, many of the participants discovered that some of the subjects can be easily presented using the IBL approach. Many teachers discovered that IBL is not very difficult or complex methodology and were interested to apply it on practice. However, they said that to consider IBL methods and active learning, they have to be better trained and to have more time for planning and organizing student activities.

Assertion 3

Teachers are used to gamify their classes, but mainly with traditional games and nondigital gamification techniques. Role-play, word games, class competitions, debates and



discussions are among the most popular gaming techniques. The only popular digital games include Kahoot!, where students can use their phones.

Some schools have licences for paid learning platforms, where are available other digital games but in general teachers are not used to organize digital learning activities or put digital games in class.

Dimension 3: School level

Assertion 1

In many schools, teachers cannot use computer labs for classes that are not for studying Information technologies. Therefore, teachers have problems to organize more complex digital activities for the students, due to the lack of ICT infrastructure in classes.

Assertion 2

Bulgarian schools are not used to involve parents in the educational process. In many schools, parents can enter into the school only in special days or after special appointment. In general, parents are not asked to take part in school initiatives, and they have a limited role in supporting teachers, in contributing or in taking decisions about the school activities of their child.

Assertion 3

Teachers rarely cooperate with other teachers and other experts, researchers, or community members for making more complex teaching activities or for organizing outdoor activities for specific classes. More incentives can be stimulated to make the learning more related to the problems of the local community.



2.5. Turkey

ASSERTIONS

Dimension 1: Student level

Assertion 1

Climate change education should be conveyed in the context of the climate crisis as a more pressing issue that requires urgent solutions.

Assertion 2

The process should be based on the student's immediate environment and the effects they see around them.

Dimension 2: Teacher level

Assertion 1

Training content that provides continuity and informs prospective teachers about changing/developing processes should be designed in the pre-service period.

Assertion 2

In the in-service period, training content that will inform teachers about changing/newly developing processes and that includes practices that can be directly associated with daily life should be designed and implemented at regular intervals.

Dimension 3: School level

Assertion 1

Students should be offered solutions to climate change by the school, so that they and their immediate environment can participate as much as possible.

Assertion 2

Schools should inform parents about the climate crisis and engage them in practices together with students. The solution to the problem should continue in school and out-of-school environments that affect students' lives, especially during the basic education period.

Assertion 3

Schools should aim for a holistic approach with extra-curricular stakeholders with the aim of continuously improving their teachers, teaching staff and school management.

LIST OF STAKEHOLDERS

1. National / regional stakeholders

Stakeholder 1: General Directorate of Teacher Training and Development

Website / Profile in social networks

https://oygm.meb.gov.tr/

Type: Government institution

Description

To organize national and international seminars, symposiums, conferences, etc., for teacher training and professional development in cooperation with teacher training higher education institutions.

Strategy to reach them

You can contact the branch of this institution in the city. The contact points can be seen in the attached link.

https://www.csb.gov.tr/il-mudurluklerimiz

Stakeholder 2: *Ministery of Environment, Urbanisation and Climate Change*

Type : Government institution

Website / Profile in social networks

https://egitimdb.csb.gov.tr/

Description

In order to protect the natural environment and create sustainable cities and settlements, the Ministry is to carry out all services related to planning, transformation, safe construction, real estate management, housing sector and the environment with a regulatory and supervisory approach based on the principles of horizontal architecture and by refreshing the identities of our cities.

Strategy to reach them

You can contact the branch of this institution in the city. In addition, social media addresses are also available, examples of which can be found below. https://www.facebook.com/cevrevesehircilikbakanligi

https://twitter.com/csbgovtr

Stakeholder 3: Republic of Türkiye Ministry of Agriculture and Forestry

General Directorate of nature conservation and national parks

Type National Parks

Website / Profile in social networks

https://www.tarimorman.gov.tr/DKMP

Description

The General Directorate of Nature Conservation and National Parks consists of 7 departments: the Department of Hunting Management, the Department of Biological Diversity, the Department of Nature Conservation, the Department of Sensitive Areas, the Department of Administrative Affairs and Coordination, the Department of National Parks and Department of Wildlife.

Strategy to reach them



You can contact the branch of this institution in the city.

2. Supra-national stakeholders

Stakeholder 1: TEMA, The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats

Type: NGO

Website / Profile in social networks

https://www.tema.org.tr/en

Description

TEMA's aims were to demonstrate that erosion and desertification, threatening our lands, could be combatted, to attract attention to the danger, to hold onto the land, to carry out deforestation, to protect the natural habitats, and to provide that this combat would be a government policy.

Strategy to reach them

While there are communication offices in the district at many points in the country, they can also be reached from their addresses on the internet.

https://www.tema.org.tr/temsilcilikler

Stakeholder 2: Climate Change Policy and Research Association

Type NGO

Website / Profile in social networks

http://climateassn.org

Description

The Climate Change Policy and Research Association aims to carry out studies on the problem of climate change in the national and international arena, to contribute to the updating of the country's legislation, to increase and support more efficient and effective studies on the problem of climate change in the academic field, including R&D, and to guide the policies of our country.

Strategy to reach them

It can be contacted via info@climateassn.org and websites. In addition, addresses are also available on the website.

Stakeholder 3: European Climate Action Network (CAN)

Type NGO

Website / Profile in social networks https://caneurope.org



Description

Climate Action Network (CAN) Europe is Europe's leading NGO coalition fighting dangerous climate change. We are a unique network, in which environmental and development organisations work together to issue joint lobby campaigns and maximise their impact.

Strategy to reach them

CAN Europe has its main office in Brussels and has offices and staff members in a whole range of countries: Denmark, Germany, North Macedonia, Poland, Serbia, Slovenia and Turkey (see below).



Annex 3: Brochure with "key messages" from policy recommendations (in English)



ClimaTePD is a project by:

Foundation for Research and Technology - Hellas (Coordinator)

Universitat de Barcelona -Department of Didactics and Educational Organization https://www.ub.edu

Friedrich-Alexander-Universitaet Erlangen Nuernberg - Insovation in Learning Institute https://www.il.fau.de/

Sofia University St. Klimen Obridski - Centre of Information Society Technologies at Scientific Research Department https://www.uni-sofia.bg

Hacettepe Universitesi (HU) -Hacettepe STEM & Maker Lab https://www.hacettepe.edu.tr



The instantial of the project reflects only the author's even. The European Commission's apport for the production of this publication does not constitute an extension environment of the contents which influent the views coly of the authors, and the Commission at the influence before Agency tames to held responsible for early we within the formation of the information contents of theme.





Towards a new model of Teachers' Professional Competence Development on Climate Change

https://www.climatepd.eu/

Message #1:

We must increase interdisciplinarity in the curriculum

Despire the work in inseparing 3759 descepting and constraints the compensate-based opposite to basic advantion. Constitution the works can tell out towards proceeding the connection between experimental and transportmental distigation.

Message#2:

Climate Change issues must be included in the curriculum

biditinging to one or none of these categories, securities and climate, attemption, water, senge, and paints and anormals. Make a extension to attemment reverse status attemption (bid) climate parties, and social meguatives, associated to climate charge social as limitant imploton.

More discussion in the classroom

Climate change issues must be approached through analysis, discourse, argumentation or persussion, among others. When students maiter these skills, the teaching will be most orduitible.

Mussage #4:

Message #3:

Teachers need specific competences

The dimate teaching completence framework should cover 3 areas: 1) Olimate charge issues in oducation; area 2) Pedagogical aspects of cimate charge education; and area 3) Professional development.

Message #5

We must support exchange of educational practices

Encouraging teachers to document their dimate change education practices and share them, and other teachers using them while crediting their authorship.

Message #6 Include climate change in

school identity As expressed in its maxim. when carricular programme and roles of builtnesses: two a builting approach, where all the personnel are recorded management, uset.

Message #7 Involve families

Schons can commende fo approach when charate change education through the cohord website, social interaction leaders messaging etc. Fundies should when personant in students' learning process and constrained any school even when these projects are showcased.



Annex 4: Bilingual brochures with "key messages" from policy recommendations





ClimaTePD: "Towards a new model of Teachers' Professional Competence Development on Climate Change"

Spanish:



Algunas claves para las administraciones educativas

Clave #1:

Un currículo más interdisciplinar

Increase interdisciplinarity in the curriculum

Hay que seguir difuminando la develón entre exemisivas, profunduar en el trabajo de integración de las disciplinas STEM, consolidar la educación babaíta en competencias y reformar la interconnection entre las disciplinas experimientales y no experimentales.

Clave #2

Las cuestiones climáticas, en el curriculum

Climate Change issues must be included in the curriculum

Se dobe inclur cuestiones relacionadas con el cambo científico, pertenecientes a una o varias de estas congorias clima, directorea, aguá, energía, plantos y animales. Hacerlo extensivo a cuestiones más recentes que afoctar a la salud, la puestea científica y las desigualidades sociales asociandos al combino climático, tales como la migración climática.



ClimaTePD es un proyecto de:

Foundation for Research and Technology - Hellas (Coordinación) https://www.secm.forth.gr

Universitat de Barcelona -Departmento de Didáctica y Organización Educativa Huss//www.ub.edu

Friedrich-Alexander-Universitaet Erlangen Nuemberg - Innovation in Learning institute https://www.ili.fau.de/

Sofia University St. Kliment Ohvidski - Centre of Information Society Technologies at Scientific Research Department

Hacettepe Universitesi (HU) -Hacettepe STEM & Maker Lab



The engineer of the project reflects only the author's views, the European Convention of a suggest for the production of this publication does not constitute an endowserver of the convents within effects the views rate of the authors, and the Convention on the Malenci National Agency connect in Nationapproximation and use within the back of the information contained therein.

Clave #3:

Más debates en el aula

Climate Change issues must be included in the curriculum

Las cuestiones relacionadas con el cambio climático deben abordarse desde el análisis, el discurso, la argumentación o la persuasión, entre otros. Cuando los alumnos tengan estas habitidades, la enseñanza de estas cuestiones será más efectiva.

Clave #4:

Competencias docentes

Teachers need specific competences Ta necesario definir competencias docentes en tres áreas principales: 1) Cuestiones del cambio cimitatica en la educación: 2) Aspectos pedagógicos de la educación sobre el cambio cimitacia; y 3) Desarrollo profesional.

Clave #5:

Fomentar el intercambio de buenas prácticas

We must support exchange of educational practices

Facilitar que los profesores y profesoras documenten sus prácticas educativas sobre el cambio clemático y las compartan, y que otros y otras las ublicen reconociendo adecuadamente su autoría. Algunas claves para las administraciones educativas Key messages from policy recommendations

Hacia un modelo de desarrollo profesional docente para la enseñanza del cambio elimático templos templos de la complete de la complete templos de la complete de la complete de la complete provincio de la complete de

mestet

Competence Dessistement on Climate Charge

https://www.climatepd.eu/es

Clave #6:

Incorporar el cambio climático en la identidad de los centros

Include olimate change in school identity

inclustrativy inclustration en su mission, valories, programa surricular y normas de cumportamiento, y aprobaris por sus organos de forna de decisiones, implicav a a tode el personal dirección, pertanal acomitizativo, profesores y la red extraescolar tramilias, proveedoros de servicios, etc.).

Clave #7:

Implicar a las familias

Involve families El centro puede comunicar su enfoque sobre la educación en materia de cambio climitico mediante los canales a lins que tas familias denen acceso página web titil centros, resés cocians, mentacianta entros, resés cocians, mentacianta entros entres con las familias taentación debersive portecipar en el proceso de querentidaje de los alumnos y/o assur a cuanquier acto escolar en el que se expongún estas proyectos.



ClimaTePD: "Towards a new model of Teachers' Professional Competence Development on Climate Change

German:



REQUIRED

Empfehlung an die Bildungspolitik:

#IEmpfehlung:

Interdisziplinarität in den Lehrplänen stärken

Increase interdisciplinarity in the eurriculum

Stärkere Verankerung der Zusammennarbeit zwischen MDNT und nicht-MINT Stachem im Enfordaris um gendweiliche füllkung zu fördern. Zief Schulernenen und Schuler auf die Heraunfunderungen des 21. Jahrhundietts vorbereizer, Schulzaßkompatenzen ertwischeh und zu krienhen, verantwortungsbeweisstent Mitglebern der Gesettschaft beranweichem

Schlüssel#2:

Climate Change issues must be included in the curriculum

Kamawandel-Themen müssen noch expliziter in den Lehrsfähre aufgesommen werden. Dies umfasst Bereiche wie Wetter und Hämia. Autopphäre, Wasser, Energie, Pflanzen und Tiere Zuckern soften Gesundheitusspekre. Klimagerechtigkeit und sosiale Ungleichheiten am Zusommenhang mit dem Klimawandel, wie etwo Klimamagraum, ebenfalls benuksichug:



ClimaTePD ist ein Projekt von:

Foundation for Research and Technology - Griechenland (Koordination) https://www.secm.forth.gr

Universitat de Barcelona -Abteilung für Didaktik und Organisation im Bildungswesen

Friedrich-Alexander-Universität Erlangen Nürnberg Institut für Lern-Innovation https://www.ili.fau.de/

Frechnologien der Informationsgesellschaft an der Abteilung für wissenschaftliche Forschung

Hacettepe Universitesi (HU) -Hacettepe STEM & Maker Lab



Schlüssel #3:

Klimabildungskompetenzen

Climate Change issues must be included in the curriculum.

Lehroläne sollen stärker auf die Vermittlung von Kompetenzen wie Analyse, Diskurs und Argumentation ausgerichtet sein, um Schüferinnen und Schülern zu befähigen, aktiv und kritisch am Thema Kimawandel teilzunehmen. Durch eine solche Bildung können sie die Auswirkungen des Klimawandels besser verstehen, Lösungen erarbeiten und zu einer nachhaltigeren Zukunft beitragen.

Schlüssel#4

Entwickelt ein Rahmenkonzept zur Verbesserung der Lehrkompetenz im Bereich Klimawandel

Teachers need specific competences Ein Rahmenkonzept für das Thema Klimabildung sollte die folgenden drei Bereiche abdecken: 1) Klimawandelthemen in der Bildung, 2) Pädagogische Aspekte der Klimawandelbildung und 3) Professionelle Entwicklung3) Fort- und Weiterbildung der Lehrkräfte

Schlüssel #5 Voneinander Lernen We must support exchange of educational practices

ELehrkräfte sollen ermutigt werden, ihre Rimawandel-Unterrichtspraktiken zu teilen sowie die Lehrkonzepte von anderen Lehrkräften zu verwenden, unter Anerkennung der Urheberschaft,

Empfehlung an die Bildungspolitik:



Auf dem Weg zu einem Modell für die beruffiche Welterbildung von Lehrkräften im Bereich der Kiimabildung

Towards A new research of Teacher's Unificate Competence Development of Climate Clim

https://www.climatepd.eu/de

Schlüssel#6:

Ganzheitlicher Ansatz

Include climate change in school identity

Des Thema Kinnewandel erforder: eine gemeinsame Gostatung und Unterstutung aller Atteurimen und Akteure in der Schule

Schlüssel #7:

Familien involvieren

Schulen können ihren Ansatz zur Klimowerdel-Bildung über die Schulweitzlin sozialet Netzwerke, Votant Messaging, uw. kommunisieten. Tamber sollten auch am Lernprozest de Schüleninnen und Schüler feltrefinnen und inder en Schulveransathungen teilnehmen, auf denen diese Projekte präsentiert werden.



Turkish:



İklim Değişikliği konuları müfredata dahil edilmelidir

Climate Change issues must be included in the curriculum

Hava durumu ve itilim, atmotifer, su, enerji, biblikr se baywarlar gita ktim konstammin multedata açık bir yekite dahil enlimesi. İkim değişikliği ile ilişikli sovari eşitsülikler anasında sağlık, iklim azateti ve iklim göçci yer almaktadır.



ClimaTePD bir proje çalışmasıdır:

Foundation for Research and Technology - Hellas (Coordinación) https://www.iacm.forth.gr

Universitat de Barcelona -Departmento de Didáctica y Organización Educativa https://www.ub.edu

Friedrich-Alexander-Universitaet Erlangen Nuernberg - Innovation In Learning Institute

Sofia University SL Kliment Ohridski - Centre of Information Society Technologies at Scientific Research Department https://www.uni-sofia.bg

Hacettepe Universitesi (HU) -Hacettepe STEM & Maker Lab

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The statement of the propert validate why the sufficient values. The European Continuation's support for the production of this publication does not constitute an ecodynamic of the contracts which reflects the value pays of the authors, and the Commanian or the letters flattered Agency consist to find responsible flat equal to evolve may be make if the information contracted densities.

like#3:

İklim değişikliği eğitimi için öğrenci becerilerinin artırılması

Increase student skills for climate change education

lilim değişikliği konularına analız, sitylem, tartışına veya ikna yoluyla yaklaşılmakdır. Öğrenciler tu becerilende ustalaştığında, öğretim en etkili şekilde gerçekleşecektir.

like #4:

İklim değişikliği öğretim yeterlilik çerçevesi geliştirmek

Develop a climate change teaching competence framework

Kapsam 3 alanı içermelidir: 1) Eğitimde iklim değişikliği konuları; 2) iklim değişikliği eğitiminin pedagojik yönleri: ve 3) Mesleki gelişim.

like #5

Eğitim uygulamalarının değişimini teşvik etmek

Promote exchange of educational practices

Öğretmenlerin iklim değişikliği eğitimi uygulamalarını belgetemeteri ve paylaşmaları için teşirik edilmesi ve diğer öğretmenterin bu uygulamaları kendi yazartıklarına antha bulunrarak kullenmaları. Eğitim yönetimleri için bazı temel konular Politika önerilerinden çıkan temel mesajlar

İklim değişikliği eğitimi için, bir öğretmenlik mesleği gelişim modeline doğru

Better Degradelig Removanda Ogenmenderte Madeki Vatertillikantens Geligtitilmaaten Vitualik Voreite Madeki Dogen

https://www.climatepd.eu/tr

like #6:

İklim değişikliği eğitimini okul kimliğine dahil edilmesi

Include climate change in school identity

Mayonuna, degerlerine, molredat programma ve davranis tlandartlarna dalal adin ve karar alma organisat transfindan onaylayan. Tum personeti dahil edini yohnitim, idaal seconeti digerimenter ve endredat dap ag dateter, humet saglayetar, vh.3

like #7: Aileleri dahil edin

Involve families

Okultar, iklim degişili bi eğinmine yaktaşımlarını okul web sitesi, sovyal ağlar, anlık mesuşlaşını eks arandığıla feretinder. Alikler de öğresisilerin ilgenime sünetme katalmak veya en azından ba proşisferin sergilendiği berhangi bir okul etkimliştive katalmandır.



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Bulgarian:



Ключови изводи и препоръки за политики



Модел за професновално развитие на учители за преподаване на изменението на BIIIMATA

https://www.climatepd.eu

Hanog #h Повече връзки между дисциплините

Трябва да се намали разделението менду продистите и да се подобри интегрирането и общи проекти по STEM дисципланите. Акцентыт трибна да е на подход основан върху компетентности, и връзката между

Извод #2:

Климатичните промени следва да се изучават

В обучението трабва да бъдат включени въпроси, сакарание с изменението на климата, оринадля кащи към одно или кличата, сраннадликация кам друга или полосфира, вода, енергия, растичия и измосфира, пребла да емиа и ергика с други жлини проблания, как здравета клиналичната, справедунност и социалнити нерасенства, справедунност и социалнити нерасност фанкции с издеенението на

Hanca #3:

Дискусии за климата в час

Темите за изменението на климата, трябва да бъдат проучвани чрез методи като анализ; аргументиране, научни дебати, базирани на данни изследователски техники и други. Колато учениците имат тези умении преподаването на тези выпроси ще бъде поофективно.

Извод #4:

Компетентности на учителите

Необходимо е да се дефинират преподавателските компетенции в три основни области: 1) Проблеми на изменението на климата в образованието; 2) Педагогически астекти на образованието по изменение на климата; и 3) Професконално развитие

Manog #S:

Споделяне на преподавателски практики

Учителите следва да могат да документират и споделят своите образователня практики и уроци за изменението на климата, така не други учители да могат да ти използват, като реферират тахното авторство по подходящ начин

Извод #6:

Изменението на климата в училищното управление

Волоннане на томите за извенноние на конзатата в мизонта, ценностити, учебнита програма и стандирти на поведение и одобраванета ако () поведение от одобравшиета нак о занитересованите лакца рак оводство, административен порезнол, учители и широкота общиност (семейства, доставница на услуги и т.э.с.).

Manog #7:

Включване на семействата

Училищито може да комуникара своя подход към борба с наменението на камията чрез канактите, до които сомойствата имат достъптуебсайт, социязник морки, кратит събебана др. Семийствата съща требна да учистват и учибние процес на учиницате иблака да присъстват на встко учиницате събетите, на което се представит тезм проекти.

