



**European Network for
Environmental Citizenship**
Cost Action CA16229

ENEC Report

Framework of the Education for Environmental Citizenship



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Deliverable 21

Framework of the Education for Environmental Citizenship

1. The Need for Education for Environmental Citizenship

Despite its importance Environmental Citizenship has been under-explored until the last few years (Dobson, 2010). Due to the complexity of the concept, Environmental Citizenship was not clearly defined and framed in relation to other concepts such as environmental behaviour, environmental attitudes, environmental literacy, environmental education, environmental knowledge, awareness and sustainability. In addition, the fragmented nature of the research findings and information related to Environmental Citizenship constraint its effective incorporation into educational practices and frameworks.

However, this comprehensive concept has been elucidated from collective research efforts and Environmental Citizenship has been conceptualized (ENEC, 2018). Environmental Citizenship is an umbrella concept that encompasses an array of characteristics such as the skills, knowledge, attitudes, values, and beliefs needed to address environmental problems, as well as all the competences needed for civic engagement and active participation in societies.

In view of the development towards more sustainable societies, citizens need to be supported to overcome challenges in taking part in sustainable societies. In addition, within a sustainable society young people need to understand that they could and should have a political role beyond the legal frameworks of representative democracies; as young people they are also citizens rather than ‘future citizens’. Empowering people to become environmental citizens is crucial for addressing current environmental issues and a necessary condition of sustainability, which is identified as one of the EU’s priorities (EEA, 2015; EU, 2013). Therefore, educating individuals and communities to become Environmental Citizens is a contemporary challenge if we are to achieve sustainable development and preserve our natural environments. If we are to educate individuals not only to act pro-environmentally, but to understand the urgency of environmental issues and to integrate pro-environmental actions into the core of their political participation and citizenship expressions, all aspects that comprise Environmental Citizenship need to be tackled specifically, systematically and precisely with in educational dimensions. Therefore, there is an imperative need for the establishment of Education for Environmental Citizenship:

an integrated education that could empower students to become responsible environmental citizens, via pedagogies which may build students' competencies for deep civic participation. Through this route Environmental Citizens could ultimately contribute to environmental and social change

2. Definition of Education for Environmental Citizenship

The European Network for Environmental Citizenship (ENEC) has set the following definition for 'Education for Environmental Citizenship' (EEC). This definition was agreed after discussions from more than 120 researchers and scholars from 37 countries. The ENEC's definition provides a concrete base on the conceptualisation of the Environmental Citizenship for twenty-first century education.

'Education for Environmental Citizenship' is defined as the type of education that cultivates a coherent and adequate body of knowledge as well as the necessary skills, values, attitudes and competences that an Environmental Citizen should be equipped with in order to be able to act and participate in society as an agent of change in the private and public sphere on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, in achieving sustainability as well as developing a healthy relationship with nature. 'Education for Environmental Citizenship' is important to empower citizens to practise their environmental rights and duties, as well as to identify the underlying structural causes of environmental degradation and environmental problems, develop the willingness and the competences for critical and active engagement and civic participation to address those structural causes, and to act individually and collectively within democratic means, taking into account the inter- and intra-generational justice (ENEC, 2018b).

3. Main goals and objectives of Education for Environmental Citizenship – EEC Model

The ultimate goals and objectives of Education for Environmental Citizenship should be determined from the outset. The pre-existing literature provides a very important basis for this purpose. Education for Environmental Citizenship should initially identify what we mean by the term Environmental Citizenship from an educational perspective. Certainly, Education for Environmental Citizenship should

ultimately identify a coherent and adequate body of knowledge (and categories of knowledge) as well as the necessary skills, values, attitudes and responsible/active behaviours that an Environmental Citizen should be equipped with in order to be able to act and participate actively as agents of change in the private and public sphere, on a local and global scale, in individual and collective actions, in the direction of solving contemporary and future environmental problems, in preventing new environmental problems, in achieving sustainability, and in ameliorating the environment and restoring relationships with nature (ENEC, 2018). It should also empower new Environmental Citizens to engage in critical collectives and to participate consciously and critically in ideology, collective, subjectivity, praxis spheres (Johnson and Morris, 2010).

This educational effort should not be seen as an imposed external behavioural change of Environmental Citizens (see criticism of individualistic behaviouristic approaches in Chawla and Cushing (2007); Robottom and Hart (1995) but as an educational process for the emergence and development of values and beliefs (Dobson, 2010), which are suppressed in the separation from nature and the environment and social isolation. Education for Environmental Citizenship should prompt young citizens to identify the underlying structural causes of environmental problems (Barry, 2005), demonstrate the willingness and the competences to engage and participate in the way to democratically advance these structural causes (acting individually and collectively) in the frames of a critical active Environmental Citizenship and inter-generational equality (Hadjichambis et al., 2015).

According to the definition of Education for Environmental Citizenship (ENEC, 2018) there are eight main intended outputs of the Education for Environmental Citizenship in non-hierarchical order:

- Solving current environmental problems
- Preventing new environmental problems
- Achieving sustainability
- Developing healthy relationships with nature
- Practising environmental rights and duties
- Identifying structural causes of environmental problems
- Achieving critical & active engagement and civic participation
- Promoting Inter- & Intra-generational justice

Following the definition of Education for Environmental Citizenship, potential actions that Environmental Citizens could undertake are of two dimensions: individual and collective, and those actions should be applied in different spheres: private and public spheres. Environmental Citizenship actions are acknowledged as actions in the public sphere when they affect the relations in societies and as actions in private spheres when they affect the relations between individuals and societies

(Postma, 2006). Figure 1 presents examples of such Environmental Citizenship actions in a 4-axis system.



Fig. 1 Examples of Environmental Citizenship action in a 4-axis system.

In addition, according to the Education for Environmental Citizenship definition, Environmental Citizenship actions can also be applied in *different scales*: local, national and global scales. The different scales of Education for Environmental Citizenship can be found in Figure 2.

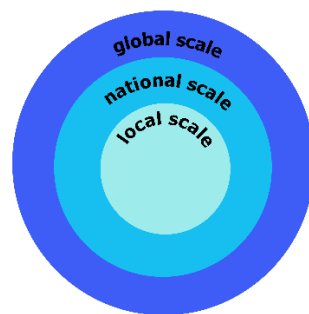


Fig. 2 The scales of action in Education for Environmental Citizenship

The constitutional elements of the Education for Environmental Citizenship above (Outputs, actions' dimensions, spheres and scales) form the EEC Model which is integrated and illustrated in Figure 3. It should be clarified that the position of each output in the EEC Model does not illustrate its relationship with actions' dimensions, spheres and scales.

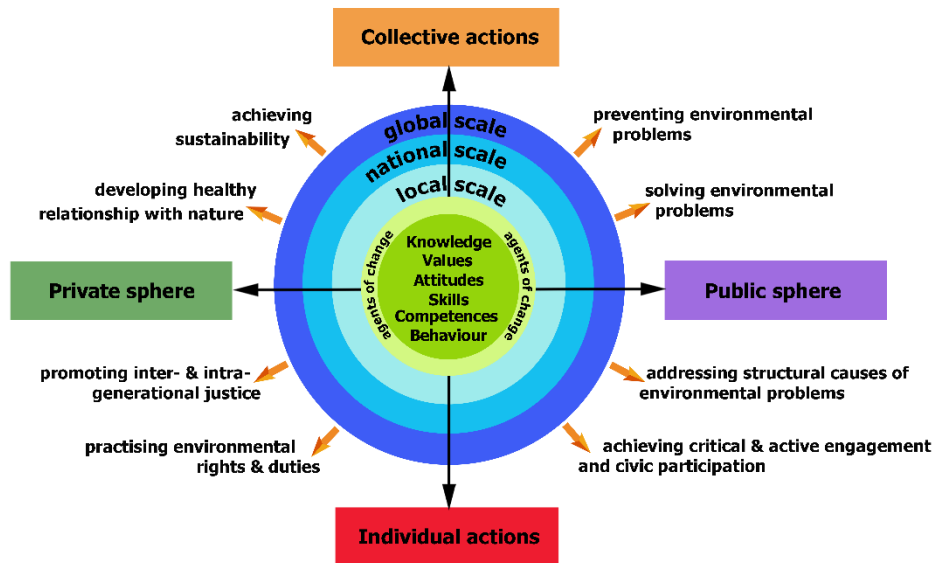


Fig. 3 Education for Environmental Citizenship Model

The following paragraphs can clarify in more depth the constitutional elements of the EEC Model.

3.1 The green cycle

At the core of the EEC Model there is a green cycle. This green cycle includes elements of the personal development of an Environmental Citizen. It includes the appropriate knowledge and types of knowledge, values, attitudes, skills, competencies and behaviours that an Environmental Citizen should be equipped with. These components are analysed in other parts of this deliverable.

3.2 Agents of change

Citizen participation is much more than putting vote in the ballot box. In an active society with a high level of commitment, there are other options for public participation and political influence with the ultimate final goal of producing change in society. “Various types of education and science initiatives around the world have already integrated students’ roles as agents of change. They provide evidence that students, indeed, have the potential to be catalysts for enhanced sustainability in their local environment and beyond” (von Braun, 2017, p.27). Agents of change mean that the students are actively participating in the process of decision-making and are also engaged in the following action-taking (Stuhmcke, 2012). According to Davis (2009), agents of change also mean that students become educators not only for their peers but also for adults and in addition, they also act as catalysts of change. Environmental Citizens have the responsibility to support and foster behavioural changes in different spheres. A good example of students acting as agents of change from global south is the Community-Kura School in New Zealand where youth protested demanding a solution for a local environmental problem and to create a community garden with the support of their teachers and parents. These students appeared confident that with these actions can be powerful on attracting attention to an environmental cause and to effect change (Hayward, 2012). The knowledge of how to democratically change a society, and how the social justice effects of those changes on the local and global society, has a central role in EEC Model. In that sense EEC Model can be considered as a change oriented framework by which the content and abilities to really make societal and environmental change for a better world can be fulfilled.

3.3 Solving environmental problems

Undoubtedly, the twenty-first century could be defined as the era of the global environmental crisis, in which myriads of environmental and social problems call into question the ability of societies to deal with them or to resolve them adequately. These global problems are characterized by complexity, interrelation and interdependence, and therefore require new approaches in understanding, managing and correlating people's relationship with nature. One of the most important outputs of Education for Environmental Citizenship is its contribution in solving current environmental problems. For Environmental Citizens it is vital to demonstrate willingness and responsibility towards solving environmental problems. Scholars (e.g., Effeney and Davis, 2013, Short, 2010; Desjean-Perrotta et al., 2008) argue for the importance of involving both students and teachers in authentic environmental problems. However, according to Green and colleagues (2016), there have been only few projects that highlight the role of citizens and governmental collective bodies in solving environmental problems until now. In order to be able to resolve environmental problems, students need to acquire skills and competencies such as problem solving, social skills (e.g., collaboration, communication), argumentation

and decision making skills, critical thinking, systems thinking, scientific or evidence-based thinking, and creative and empathic thinking (e.g. Shcusler et al., 2009; Berkowitz et al. 2005; Mintzes et al., 1998; Schauble, 1996). Retrospectively, such skills and competences can be cultivated in students if they are engaged in current authentic environmental problems.

3.4 Preventing environmental problems

The importance of preventing new environmental problems was highlighted in the Tbilisi Declaration (UNESCO, 1977). It is aligned with the precautionary principle, which calls for protective actions for the environment even if evidence of harm remains uncertain (Foster et al., 2000). It incorporates willingness and attitudes for eliminating the creation of new environmental problems. For this, the identification of a threat, the understanding of uncertainty, the evaluation of different alternatives and decision making for the appropriate stance or action are all important (Sandin, 1999). With these goals the EEC Model is charged to foster Environmental Citizens who are capable and willing to prevent new environmental problems.

3.5 Achieving sustainability

Achieving sustainability is an ultimate task of education for Environmental Citizenship. Principles that underlie sustainability include concepts such as inter-generational equity, social justice, environmental preservation and restoration, natural resource conservation, and just and peaceable societies laying in the three dimensions of environmental, social and economic sustainability (UNESCO, 2005). Achieving sustainability, from the Education for Environmental Citizenship perspective, includes also the co-creation of sustainability policy and the active participation of citizens in moving towards sustainability. Those citizens believe that environmental sustainability is the common good, living by the principles and practices of sustainability, but also having the vision of a democracy more relevant toward sustainability. These citizens are equipped with the appropriate values, worldviews, and prevailing power structures within society as well as the ability to address unsustainability by challenging the current situation (e.g., Dobson, 2010; Barry, 2005; Schild, 2006; Maniates, 2001).

3.6 Healthy relationship with nature

Many researchers have theorised what it means to have a healthy relationship with nature, and many have developed theories and models that they think are more effective to help students develop this kind of relationship. There are important differences and conflicting opinions in the environmental education literature (Verhulst, 2004).

A healthy relationship with nature is the result of the connectedness of humans with it. Nature connectedness is the extent to which individuals include it as part of their identity (Schultz, 2002). It includes an understanding of nature and everything it is made up of, even the parts that are not pleasing (Nisbet et al., 2009). Characteristics of nature connectedness are similar to those of a personality trait: nature connectedness is stable over time and across various situations (Nisbet et al., 2010).

According to Schultz (2002) three components constitutes the Nature Connectedness construct:

- The cognitive component is the core of nature connectedness and refers to how integrated one understands nature.
- The affective component is an individual's sense of care for nature.
- The behavioural component is an individual's commitment to protect the natural environment.

Verhulst and Colton (2004) state that promoting a healthy relationship with nature requires the development of literacy and citizenship. In addition, Curthoys and Cuthbertson (2002) describe an ecologically literate citizen as "someone who knows about, cares for, and acts on behalf of the cultural and ecological integrity of their home place" (p. 227). Engaging nature experiences, including greening learning grounds, nature-based field trips and journaling, are considered by Curthoys et al. (2004) as effective approaches to achieving healthy relationships with nature. According to Shume (2016) environmental literacy extends beyond conceptual knowledge to describe what is needed for healthy and responsible human relationships with nature.

Recently, reference to a 'healthy relationship with nature' has been made in the fourteenth meeting of the conference of the parties to the convention on biological diversity (CBD, 2018). In the recommendations for increased focus on connecting people with nature to inspire enhanced action on biodiversity conservation, it stated that "humans are capable of reversing the trends of the immediate past and present in order to achieve a new and healthy relationship with nature, a relationship that embodies an inherently regenerative and life-nurturing way of being on Earth. This regenerative relationship, combined with informed and responsible action, will achieve a healing time on Earth. In the process, we will heal ourselves". In the same article (article 27), personal experiences with nature and an understanding of the connected indigenous relationships are considered important in order to increase the understanding of environmental challenges and to develop the appropriate actions needed to address those challenges. For more recent generations, nature is more an

abstraction than a reality (Louv, 2008). In an era where young people are less connected to their own neighborhood than to peers in other countries (via social networks), Education for Environmental Citizenship considers it a major challenge to connect our youth to society and their environment (taking them from their comfort sphere to the unknown nature outside). Within the EEC Model (Fig. 3), empowering youth to develop healthy relationships with nature can function as a treatment for the global environmental crisis.

3.7 Environmental rights and duties

The knowledge, or even more importantly, the practice of both the Environmental rights (liberal tradition focus) and duties (republican tradition focus) are very important for Education for Environmental Citizenship. In the context of liberal discourses, Environmental Citizenship emphasises the environmental rights of individuals such as the right to clean air and clean water (Haywood, 2000). In addition, environmental liberalism has tried to claim that it attributes rights to the non-human nature, which obliges the political system to support these rights (Dagger, 2006). On the other hand, in the context of civic republican discourses, Environmental Citizenship emphasises the citizen's obligation to work for the common good, underlining that environmental protection is part of this common good. Thus, citizens have three main duties: (a) to work against anything that damages the civic identity and engagement of citizens; (b) to be aware of individual and collective actions that affect the state of the environment; and (c) promote decisions of the common good over individual interests (Shields, 2016).

Table 1 Examples of Environmental Rights and Duties.

Environmental Rights and Duties
Right to life and to a pure environment for every human being
Public access on environmental data and information (Aarhus convention)
Practice the right for public participation
Public access to justice
Good environmental governance
Need for environmental impact assessment and strategic environmental assessment documentation
Public consultation
Obligation not to cause environmental impacts
Inter- and Intra-generational equity
The polluter pays principle
Applying the Precautionary principle
Applying the Subsidiarity principle

Education for Environmental Citizenship emphasises that Environmental Citizens should be able to practise their environmental rights and duties, taking into account that both rights and duties may remain unfulfilled “as long as persons do not have the capacity to act in a civil society” (Stec et al., 2000). The practice of environmental rights and duties from Environmental Citizens is an important component of the EEC Model. Some examples of environmental rights and duties promoted by the EEC Model are listed in Table 1.

3.8 Structural causes of environmental problems

Environmental degradation is a result of the dynamic inter play of socio-economic, institutional and technological activities. Environmental changes may be driven by many factors including economic growth, population growth, urbanisation, intensification of agriculture, rising energy use and transportation. Barry (2005) argues strongly about the importance of civic engagement with the structural causes of environmental degradation and destruction. According to the same scholar, it is not enough for the citizen only to try to solve an environmental problem or to restore a degraded environment. An Environmental Citizen is also required to be able to identify the structural causes of the environmental problem and work adequately and democratically to address them.

The EEC Model highlights the importance of helping students understand the structural and systemic causes of contemporary environmental and social problems. The political responsibility for citizens is to promote structural changes, for instance through active participation in deliberations on the values that ought to guide society and policy making (Achterberg, 2002; Barry, 1999). It is suggested that environmental issues need to be re-politicized such that the underlying structural and institutional drivers of these problems are highlighted.

3.9 Civic participation

Fundamental for Education for Environmental Citizenship is the civic participation of students. Education for Environmental Citizenship should empower students with the skills or competencies necessary to take part in collective actions, participatory processes and critical and active civic engagement. This type of civic participation equips individuals to take part in the democratic processes in order to respond to the imperative need for sustainability. It includes the socio-political participation in relevance with the structural causes of unsustainability and the actions needed to achieve sustainability.

Civic participation can operate at any level of community and in any community organisation and context (including schools). Three sub-domains of civic partici-

pation can be identified: Decision-making, Influencing, and Community participation (Schulz et al., 2016). The critical praxis of Environmental Citizenship implies elements of critical pedagogy (e.g., Freire, 1987) and a capacity to critically examine and assess the complexities, patterns and politics that promulgate local and global environmental problems.

3.10 Inter- and Intra-generational justice

It is vitally important to see that Environmental Citizenship is a matter of justice, not of charity (Dobson, 2007). It includes as important both inter-generational justice and intra-generational justice. Inter-generational justice elaborates the justice between different generations, focusing on the necessity to take into account the needs of the future generations. Intra-generational justice explains the issues of justice and injustice within one generation (mainly refers to current generations).

Inter-generational justice is fundamental for sustainability. Future generations have the right to fulfil their demands and requirements. A key sustainability question is “what kind of world do we want to hand on to future generations?” The environmental rights and duties of the Environmental Citizen extend from one generation to another.

In the EEC Model, intra-generational justice includes as an important element of social justice within the boundaries of the state. In addition, intra-generational justice goes beyond the territorial boundaries of the state and sees justice and injustice on a global scale. It incorporates the global south, including indigenous populations, in the debate of the fairness of the distribution of environmental goods, and the participation and the co-creation of sustainability policy, among others.

An example of a campaign examining cases of injustice is the “Sea of hands campaign for recollination” from Australia, in which students gain skills to listen empathically with compassion. This campaign aimed to foster greater understanding of shared public citizenship responsibility for past cases of injustice of war, colonisation, domination and genocide (Hayward, 2012).

4. A comprehensive and holistic approach for Education for Environmental Citizenship- Description of EEC Pedagogical Approach

4.1 The pedagogical landscape of Education for Environmental Citizenship

It is important to define the pedagogical landscape in which Education for Environmental Citizenship lies. Some existing pedagogical approaches are important for

Education for Environmental Citizenship because they contribute to some extent to its scope and aims. The following pedagogical approaches are forming the pedagogical landscape of Education for Environmental Citizenship (Figure 4):

- Place-based learning
- Problem-based learning
- Civic ecology education
- Pedagogy for eco-justice
- Action competence learning
- Community service learning
- Participatory action research
- Socio-scientific Inquiry-based Learning

Place-based learning boosts students' engagement, academic achievement and a sense of efficacy as stewards of the nature and the environment. It incorporates local social and environmental organisations and can contribute to resolving local environmental issues (Smith, 2007; Gruenewald, 2014). The strength of place-based education within Education for Environmental Citizenship lies in its ability to offer students authentic opportunities to participate in effecting positive change within their local communities, thereby leaving students with a higher "sense of their own agency and collective capacity" (Smith, 2007, p. 192). ***Problem-based learning*** can contribute to Education for Environmental Citizenship because it organises investigations and inquiry focusing on authentic and real life problems. Authentic real life experiences foster active learning, support knowledge construction and integrate school learning and real life (Association for Supervision and Curriculum Development, 2005; Barrows, 1994).

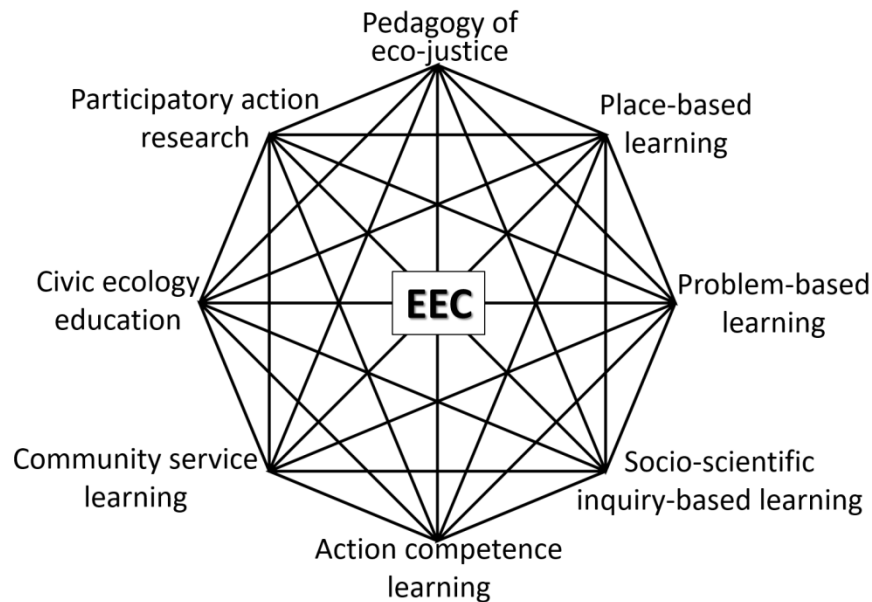


Fig. 4 The pedagogical landscape of Education for Environmental Citizenship

Civic ecology education can provide another example of how Environmental Citizenship could be promoted in formal and non-formal settings. Civic ecology focuses on stewardship practices within natural and anthropogenic environments. These approaches create real-life contexts for management of resources, enabling an experiential and participatory learning, while also enhancing environmental and social improvements (Tidball and Krasny, 2010). *Ecojustice pedagogy* also offers a valuable pedagogical tool in Education for Environmental Citizenship that helps to ground epistemological elements of ecological thinking in meaningful praxis. It includes out of classroom activities so that students can experience the knowledge of different cultures, bridges western scientific knowledge with traditional ecological knowledge, and adds an ecological lens to social justice (Bowers, 2001). Pedagogy for eco-justice contributes to Education for Environmental Citizenship as it focuses on social justice and works to replace attitudes with the metaphor of ecology promoting a healthy relationship with nature. *Action competence learning*, as an educational approach, aims not to modify specific behaviours like recycling or saving water, but rather engages youth in planning and taking action on environmental issues they find relevant. It also involves shared decision making, which occurs when adults and youth collaborate in planning, implementing and evaluating a project, whether the project is initiated by youth or adults (McGill & Brockbank, 2004; Revans, 1998). In addition, according to Schusler and Krasny (2015) environmental action occurs at the intersection of youth civic engagement and inquiry-based education. *Community service learning* is important in forming the Education for En-

vironmental Citizenship landscape because it brings the connection with the community and community organisations and integrates the collaboration of the members of community organisations with educational institutions (Hayes, 2006).

Furthermore, *participatory action research* imports substantial elements to the pedagogical landscape of Education for Environmental Citizenship (Fig. 4). It specifically includes aspects of social learning in a way that true participation through research will bring social change (Moore, 2005). Finally, *Socio-Scientific Inquiry-Based Learning (SSIBL)* is another pedagogical approach that can foster democratic citizenship in general, and Environmental Citizenship in specific formal and non-formal settings (Levinson et al., 2017; Amos et al. 2018). SSIBL connects inquiry based learning in socio-scientific issues with citizenship education. It draws together three interacting pillars – Inquiry Based Science Education (IBSE), Socio-Scientific Issues (SSI) and Citizenship Education (CE) – within the umbrella of Responsible Research and Innovation (RRI). It includes raising authentic questions about controversial issues [Ask], integrating social and scientific inquiry to explore these open-ended questions [Find out], and formulating solutions which help to enact change [Act] (Levinson et al., 2017; Amos et al., 2018).

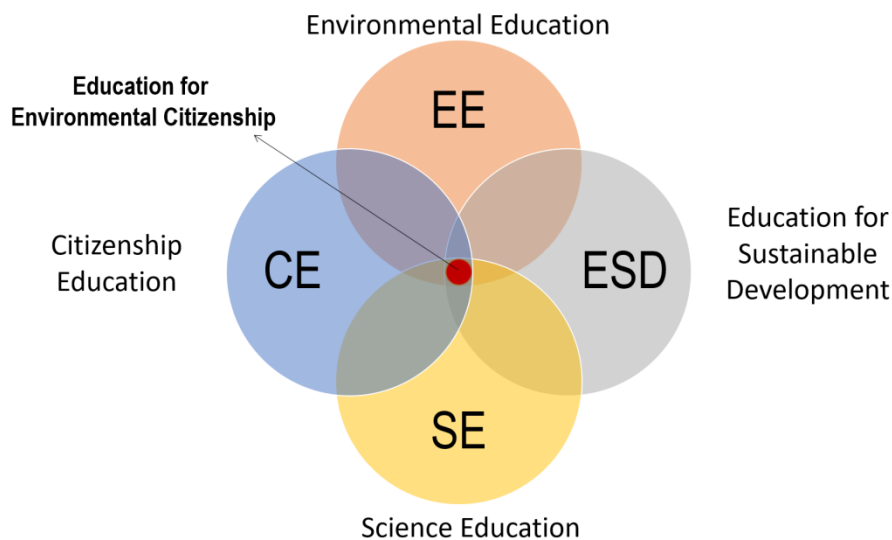


Fig. 5 Education for Environmental Citizenship and other types of education

In conclusion the above pedagogical approaches can importantly contribute to Education for Environmental Citizenship; however, none of them alone can promote the scope and aims of the EEC Model and its outputs (ENEC, 2018). In addition, Education for Environmental Citizenship integrates and builds upon pre-existing types of education such as Environmental Education (EE), Education for Sustainable Development (ESD), Science Education (SE) and Citizenship Education (CE) (Figure 5). Education for Environmental Citizenship advocates a need to

move beyond a central focus on individual attitudinal and behavioural changes towards collectively building a better understanding of environmental learning processes aimed at socio-ecological change. A need for Education for Environmental Citizenship Pedagogy arises which could collectively develop in today's youth the knowledge, skills, and competencies needed to be ecologically and socially responsible Environmental Citizens. There is a need for Education for Environmental Citizenship Pedagogy that could provide learning experiences to build students' competencies for deep civic participation contributing to environmental and social change.

4.2 Description of the Education for Environmental Citizenship Pedagogical Approach

It is important here to identify the pedagogy that needs to be at the heart of Education for Environmental Citizenship and can adequately promote the EEC Model. The suggested pedagogical approach is one of the possible venues that could promote Education for Environmental Citizenship. Of course other pedagogical approaches could also be proved suitable to promote Education for Environmental Citizenship. The starting point is a local environmental problem which draws on students' interests and concerns, a problem that their community faces and they feel that they have to do something about it. A starting point could also be a global environmental problem with some local symptoms making students feel relevant and able to act as agents of change as described earlier in the chapter. Students' interests could be stimulated using prompts such as pictures, videos, controversial news items.

The Education for Environmental Citizenship Pedagogical Approach includes six (6) stages: Inquiry, Planning actions, Critical & active engagement and Civic participation, Networking & Sharing in Scales (local, national, global), Sustain Environmental & Social Change, and finally Evaluation & Reflection (see Figure 15.6). These stages are not in a strict linear sequence and an entry point can be any one of the six which feeds better to the case. Each of these stages includes different steps which all together integrate the Education for Environmental Citizenship Pedagogical Approach as a comprehensive and holistic pedagogy. However, it is important to emphasise that for either a teacher or student team it is not compulsory to apply all the steps that are proposed below.

Inquiry stage includes five (5) steps: Data collection and analysis, Structural causes, Inter- & Intra-generational injustice, Value clarification, and Outdoor place-based activities. During this stage students are going to carry out the data collection and analysis which are necessary for the exploration of the environmental problem studied. These data are important in order to have scientific evidence for their argumentation. Examples include data regarding the ecological importance of the relevant ecosystem, biodiversity data, climatic data, or social and economic data related

to the environmental problem studied. In addition, students should gain some information regarding the *structural causes* of the environmental problem under study. For example, ineffective environmental laws or ineffective procedures to protect nature, conflicting interests for a development or prioritising economic development against the protection of the environment. An important step for students at this stage is to examine cases of *Inter- & Intra-generational injustice* relevant to the environmental problem in focus. For example, students could observe accumulation of wealth to specific developers (Intra-generational injustice) or infringement of environmental rights and duties or even that future generations will be deprived of some ecosystemic services (Inter-generational injustice). *Value clarification* is also important at this stage. Students raise fundamental questions relating to the underlying values behind the environmental problem studied. For example, which values underpin various stakeholder groups' dispositions (e.g. developers, students, environmentalists etc.)? Finally, *outdoor place-based activities* could be included giving students a sense of efficacy as stewards of the nature and the environment and increasing their engagement and feeling of relevance.

Planning actions is another essential stage of the Education for Environmental Citizenship Pedagogical Approach. In this stage students are asked to plan individual and collective actions in private and in public spheres. Identification of the *relevant stakeholders* with the specific environmental problem is core. For example, for a local environmental problem the relevant stakeholders could be developers, ecologists, students, government, neighbours. *Mapping controversy* is another step in this stage. Mapping stakeholders' positive and negative arguments and the inter-relationships of the stakeholders and their arguments are crucial for students to understand the complexity of the environmental problem studied (e.g., Latour, 2005). Recording and examining possible *alternative solutions* for the environmental problem studied is another step in this stage. The examination of the positives and negatives of each alternative solution could be undertaken in the frames of sustainability (environmental, social, economic sustainability). In a next step, students could investigate the *structural resistance* that could face a proposal and (Paraskeva-Hadjichambi et al., 2012). Some examples of possible structural resistance that could be identified include the resistance from the system, the non-elastic laws, conflicting interests and interference, and the economic conditions conducive to growth at the expense of the environment. Finally, at this stage a risk assessment could be very important for the students. Risks should be identified in advance so students can be ready to handle them. Some examples of risks could be upset and confrontation in the community or blaming on personal and collective level.

Education for Environmental Citizenship Pedagogical Approach



Fig. 6 Education for Environmental Citizenship Pedagogical Approach

Civic participation is a vital stage for Education for Environmental Citizenship Pedagogical Approach. *Decision making* is, according to Schulz and colleagues (2016), the first and important component of civic participation. In this step, students need to make decisions keeping in mind alternative solutions (Paraskeva-Hadjichambi et al. 2015). In this step students can also decide to contact scientists, environmental organisations, politicians and other stakeholders to present their views, suggestions and decisions for the specific environmental problem. Another step in this stage is the *practice of environmental rights and duties*. Examples of such rights and duties can include access to environmental data and information, the right for public participation and consultation, the public access to justice, the need for environmental impact assessment, and strategic environmental assessment documentation. The next step is the application of *actions in community* including individual and collective actions in private and public spheres. Students could proceed to organise a campaign-lobby or donate towards a campaign and the protection of the environment, become volunteers, publish an article in a local newspaper or participate in radio and TV broadcasts regarding the environmental problem and the possible solution. These are only some examples of the possible actions in the community. Organising or participating in a *public debate* could be another possible step. Public debates have proven to be very beneficial both in students' education but more importantly in helping students to practising citizenship (Hadjichambis et al., 2018; Owens et al., 2017; Gregory et al. 2005). Finally, organising and participating in other forms of *student activism* are also important. Informing campaigns for peers, families, communities and the general public, organising and participating in protests or demonstrations could give opportunities for students to practise different forms of civic participation that could prove beneficial for their development in terms of knowledge, skills, competencies, self-efficacy, self-esteem, and socio-political empowerment ((Baptista et al., 2018; Marques and Reis, 2017; Schusler and Krasny, 2015; Simonneaux, 2007). In addition, it has been proven to be beneficial for environmental and social transformation (Bencze and Carter 2011; Freire, 1987).

Networking & Sharing in Scales is an important stage for the Education for Environmental Citizenship Pedagogical Approach. Students can organise *local networks* of students, scientists, volunteers, supporters, activists and politicians. In this way students can influence their local community and encourage local communities to realise the importance of the environmental problem studied. Students can also upgrade the discussion of the specific environmental problem to a national scale. The development of *national networks* also by students, scientists, volunteers, supporters, activists, politicians and others can help in this direction. Connecting with national environmental NGOs is also important in this step. Finally, students can attempt to inform the global community for the environmental problem which is under study. They can try to create *global networks* of action mobilising students, scientists, volunteers, supporters, activists and politicians in other countries in a global action dimension. Connecting with international NGOs is of outstanding importance. The recent global movement for climate change (e.g. FFF - Fridays for Future, a global weekly day of climate activism involving students) proved that this

attempt is possible. Social media, social networks, blogs and other recent information technology applications can be very influential in such attempts (Gerbaudo, 2018). According to Aday and colleagues (2010), social media is often used as a means of representation, and also as a tool for ‘citizen journalism’, such as the use of web live streaming services or a YouTube video that elicits episodes of police brutality. What is most interesting is their use as a means of organising collective action and more specifically as a means of mobilisation (Lievrouw, 2011). Therefore, social media can be used to organise and promote international campaigns.

Sustain Environmental & Social Change is the stage of Education for Environmental Citizenship Pedagogical Approach where supplementary efforts are taking place in order to sustain environmental and social change. In this stage students could *support* and *improve* the previous actions, for example keeping the issue in the news and they could *adopt* new reinforcing measures and actions. Another important step in this stage is to *integrate additional actions to address structural causes* in other areas and in other levels. An example is where students send official letters to parliament or an official letter to the Minister for the Environment reporting an environmental policy deficit. This could be a deficit of current environmental legislation, a deficiency in the implementation of environmental legislation, a deficiency of environmental structures and infrastructures or even deficit of environmental ‘culture’. In another step, students could *reward* those who helped in their actions (e.g., students, volunteers, supporters) by sending, for example, a letter of thanks. Finally, they can *inform* the public of their success and disseminate successful actions.

Evaluation & Reflection is the last stage included in the Education for Environmental Citizenship Pedagogical Approach. Students can *audit* the success of different actions (e.g. demonstrations, official letters). They can *measure* several achievements (e.g., knowledge of students before and after, attitudes of students before and after, values of stakeholders or of the community, skills and competencies before and after the intervention). Students can also *assess* the efficiency of their applied Education for Environmental Citizenship Pedagogical Approach, and inspect hidden dimensions of the procedures and steps of the applied approach. Finally, students can *focus* on positives and negatives of the applied Education for Environmental Citizenship Pedagogical Approach and lessons learned.

5. Implementation of EEC approach

5.1 *Enrichment of current curricula*

Environmental Citizenship is not commonly dealt with in current textbooks and current curricula. Important guidelines for Education for Environmental Citizenship could be envisaged through Curriculum. What are the characteristics necessary for curricula to promote Education for Environmental Citizenship?

Education for Environmental Citizenship could enrich curricula with an innovative, integrated and holistic perspective combining knowledge, skills, values and beliefs, attitudes, and behaviours with individual and collective environmental action in private and public spheres as previously described. Such a perspective reinforces the teaching of education for sustainability with a novelty not always found in other areas of the curriculum (Stokes et al., 2001). This removes the walls that isolate the school from society and science and allow for the elaboration of important partnerships between school, science and society. Apart from the philosophy and general purpose, the curricula should also incorporate methodology, differentiation in the several levels from early childhood to higher education, and any educational sector from formal to non-formal and informal settings. The ways of assessing and measuring the outcomes of Education for Environmental Citizenship is also of crucial importance. Teaching Attainment Targets and Indicators of Competence for Environmental Citizenship will embody curricula with even greater efficiency.

5.2 Development of learning materials

What kind of learning materials and programmes, are necessary for promoting Education for Environmental Citizenship?

Engaging students in authentic controversial environmental socio-scientific issues that need a solution could be of great importance. Environmental education which focuses on authentic inquiry and action as well as on civic engagement and participation is more appropriate for the development of the Environmental Citizenship needed to achieve sustainability (Berkowitz et al., 2005) and responsible research and innovation. The Education for Environmental Citizenship curricula is important to provide opportunities for students to act as environmental citizens. Assessment of Education for Environmental Citizenship should take place at different levels from the micro-level to the macro-level, from the individual level to the collective level, and from knowledge to praxis. The Education for Environmental Citizenship Pedagogical Approach could be implemented in both formal and non-formal settings as well as in different levels of education (e.g., primary and secondary). Of course, an adequate differentiation should be undertaken according to students' ages, educational settings as well as educational contexts. Future research with empirical studies will shed light in this differentiation of the Education for Environmental Citizenship Pedagogical Approach.

5.3 Best practices

Due to the novelty of Education for Environmental Citizenship, it will be important to identify some best practices as successful learning materials, programmes and projects.

6. Teacher's Professional Development for Education for Environmental Citizenship

Teachers play a crucial role in influencing the knowledge, values, attitudes, actions and their students' citizenry towards the environment and thus influence the outcome of the observed environmental challenges (e.g., Hungerford, 2010; Desjean-Perrotta et al., 2008). Pre-service and in-service training is therefore of particular importance to empower teachers to act as formative agents of Environmental Citizenship. However, what abilities and competences should teachers have in order to be able to engage in Education for Environmental Citizenship? Which Teacher Professional Development (TPD) models are the most appropriate to train educators for Education for Environmental Citizenship? Which teacher-oriented strategies could help the establishment of Education for Environmental Citizenship? These are questions that need to be answered in order to facilitate teachers' engagement in the new initiative of Education for Environmental Citizenship.

A large number of scholars argue for the importance of ecological literacy in teacher education (e.g., Effeney and Davis, 2013; Desjean-Perrotta et al., 2008). Well-designed teacher professional development programmes aiming at Environmental Citizenship, in addition to ecological literacy, need to include educational approaches that involve teachers in the process of solving authentic environmental problems (Short, 2010). Additionally, TPD programmes should include place-based practices that allow teachers to realise the scientific, social, economic, political and cultural dimensions of the environmental problems (Gruenewald, 2003). However, such projects that highlight the role of citizens and governmental collective bodies in solving environmental problems are rare, and research on environmental action projects in teacher education is limited (Green et al., 2016). According to Green et al. (2016) if we want teachers to connect students to the natural environment and their communities, then it is essential to engage teachers in environmental action projects in the community that prompt them to critically assess the complexities, patterns and politics contained in environmental problems and therefore help teachers to clarify their own values and actions in terms of local and global environmental issues.

Furthermore, teachers' professional development could be situated in practice, and moves from awareness to a progressive refinement of the understanding of the new ideas through cycles of co-design and learning from peers. Co-design is an important element of learning in the contemporary professional development of teachers (Kyza and Nicolaidou, 2016; Kyza and Georgiou, 2014). In such TPD approach teachers are engaged in multiple roles such as learners, designers, innovators, and reflective practitioners (Kyza and Georgiou, 2014), which allow them to better understand their multiple roles and to reflect on their own practices as well as those of their peers (Kyza et al., 2018).

7. EEC in Educational Systems (Educational system level, school level, classroom level)

What strategies should educational institutions and systems apply that can foster Environmental Citizenship? What is the role of schools in Education for Environmental Citizenship? Schools and educational institutions, including those from non-formal education settings such as environmental education centres and natural history museums, should adopt Education for Environmental Citizenship in their daily educational practice. Once the importance of Education for Environmental Citizenship is recognised, it could be integrated into their environmental policy and promoted using a targeted strategic plan. Schools need to realise and accept their role and place in society as agents for change and in the transformation of the environment and society towards a more sustainable, responsible and fairer world in the frames of Environmental Citizenship. Of course there are difficulties as well as obligations in this attempt. School communities should be aware of environmental issues and have the determination and ability to improve environmental conditions. They have one of the most significant roles to play and this is to provide a democratic context for shared values as well as for the development of spiritual and moral dimensions of Environmental Citizenship (Ashley, 2000). All these are important because the ability to ‘take action’ – understood as a conscious action than as an instinctive response – is a prerequisite for actions of Environmental Citizenship (Carlsson and Jensen, 2006). In addition, school communities should not focus only on purely individual action. As Schindel Dimick argues (2015, p.399) “individual action and consumption show students only limited ways that they can interact with the environment, but there is another way – as the environmental citizen– in which they can act as members of a public that have shared obligations with others to address concerns about the environment and its resources for themselves, for the global community, for non-human life on earth, and for future generations”.

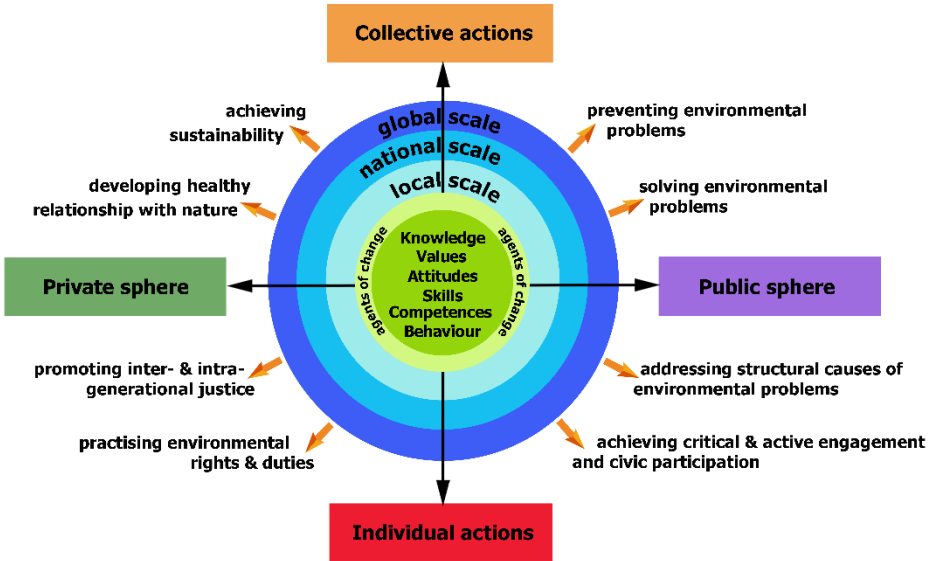
The establishment for synergies, partnerships and support from academic institutions, NGOs and other social actors could empower schools and educational institutions to adopt flexible mechanisms for integrating Education for Environmental Citizenship. The adoption of environmental landscapes and ecosystems near the school will strengthen the relationships of the school with the local environment and the local communities, which will not only help students to understand their environment, what is affecting it and its problems, but also to develop participatory behaviours and actions of citizenship to solve these environmental problems. However, many external factors influence schools and educational institutions such as school systems, professional unions and associations, available instructional materials and resources, standards and the results of assessments, parents, taxpayers, trade associations, educational organisations. These all affect a school’s policy and its effectiveness (Hoy and Miskel, 2008) and not always in a positive way. Schools should therefore evaluate these external factors and plan appropriately

8. Evaluation of EEC

There is a need to have the appropriate metrics to assess the outputs of Education for Environmental Citizenship on students, groups, classes, educational programmes, schools, communities, educators, the educational community, and even in educational systems. These needs could be an emphasis in future research.

9. The Framework of the Education for Environmental Citizenship at a glance

1.	The Need	There is an imperative need for the establishment of Education for Environmental Citizenship: an integrated education that could empower students to become responsible environmental citizens, via pedagogies which may build students' competencies for deep civic participation. Through this route Environmental Citizens could ultimately contribute to environmental and social change.
2.	Definition	Education for Environmental Citizenship' is defined as the type of education that cultivates a coherent and adequate body of knowledge as well as the necessary skills, values, attitudes and competences that an Environmental Citizen should be equipped with in order to be able to act and participate in society as an agent of change in the private and public sphere on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, in achieving sustainability as well as developing a healthy relationship with nature. 'Education for Environmental Citizenship' is important to empower citizens to practise their environmental rights and duties, as well as to identify the underlying structural causes of environmental degradation and environmental problems, develop the willingness and the competences for critical and active engagement and civic participation to address those structural causes, and to act individually and collectively within democratic means, taking into account the inter- and intra-generational justice.
3.	Main goals and objectives -EEC Model	<p>A. Promote students' personal development:</p> <ul style="list-style-type: none"> • Knowledge • Skills • Attitudes • Values • Competences • Behaviour <p>B. Empower students' potential actions</p> <ul style="list-style-type: none"> • In two dimensions: individual and collective • In two spheres: private and public • In three scales: local, national and global <p>C. Achieve EEC outputs</p> <ul style="list-style-type: none"> • Solving current environmental problems • Preventing new environmental problems • Achieving sustainability • Developing healthy relationships with nature • Practising environmental rights and duties • Identifying structural causes of environmental problems • Achieving critical & active engagement and civic participation • Promoting Inter- & Intra-generational justice <p>D. Equip students to act as agents of change</p>

		<ul style="list-style-type: none"> • Change society and promote sustainability • Educate peers and adults to act in eco-friendly way • Actively participate in decision-making and engaged in action-taking 
4.	EEC Pedagogical Approach	<p>A. Starting point</p> <ul style="list-style-type: none"> • Local environmental problem which draws on students' interests and concerns • Problem that students' community faces and they feel that they have to do something about it • Global environmental problem with some local symptoms <p>B. Implementation stages</p> <p>1. Inquiry</p> <ul style="list-style-type: none"> • Students <i>collect and analyse data</i> regarding the environmental problem • Students examine the <i>structural causes</i> of the environmental problem • Students examine cases of <i>intra- & inter-generational injustice</i> in relation to the environmental problem

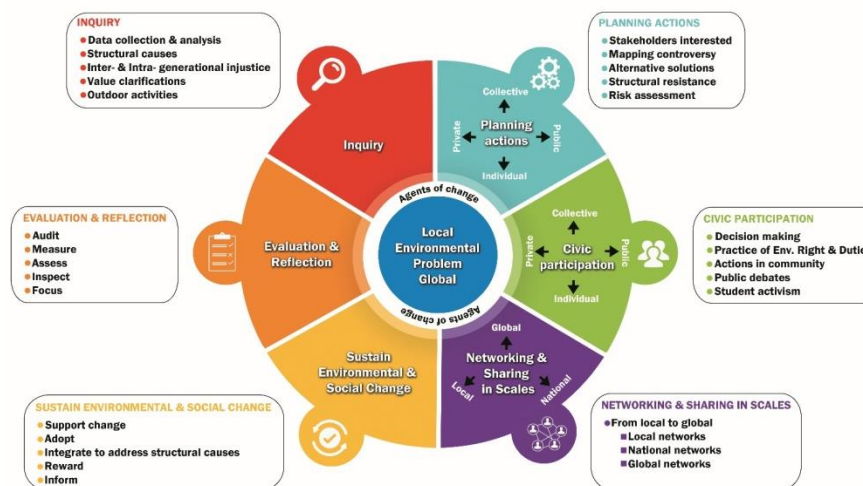
		<ul style="list-style-type: none"> • Students examine and clarify the values driving different stakeholders (e.g., developers, ecologists) relevant to the environmental problem • Students take part in outdoor and place-based activities in the field to study the environmental problem <p>2. Planning actions</p> <ul style="list-style-type: none"> • Students record the stakeholders' interests to the environmental problem under study • Students map the controversy and arguments from the different stakeholders • Students examine the possible alternative solutions to the environmental problem • Students study the possible structural resistance with the planned changes • Students assess the risks from the planned actions <p>3. Civic participation</p> <ul style="list-style-type: none"> • Students decide and select an alternative solution • Students practice their environmental rights and duties • Students apply individual and collective actions in a private and public sphere • Students organise and/or participate in public debates • Students organise youth activism actions <p>4. Networking & Sharing in Scales</p> <ul style="list-style-type: none"> • Organise local networks of students, scientists, volunteers, supporters, activists, politicians <ul style="list-style-type: none"> • Maximise the impact by organising national networks of students, scientists, volunteers, supporters, activists, politicians. Connect with national NGOs • Maximise the impact organising international networks, Connect with international NGOs. Develop international campaigns through social media <p>5. Sustain Environmental & Social Change</p> <ul style="list-style-type: none"> • Students apply additional actions to support change • Students adopt new measures that can sustain change • Students apply actions to address structural causes • Students reward people who participated and helped
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- Students *inform the public* of their successful actions

6. Evaluation & Reflection

- Students *audit* the success of the applied actions
- Students *measure* the change in some dimensions
- Students *assess* the effectiveness of the approach
- Students *inspect* hidden dimensions of the approach followed
- Students *focus* on the positives and negatives of the approach and lessons learned

Education for Environmental Citizenship Pedagogical Approach



5.	Implementation of EEC approach	A. Enrichment of current curricula
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		<ul style="list-style-type: none"> • Enrich curricula with the integrated and holistic perspective of EEC combining knowledge, skills, values and beliefs, attitudes, and behaviours with individual and collective environmental action in private and public spheres • Introduce in curricula important partnerships between school, science and society • Incorporate in curricula methodology, allowing differentiation in the several levels from early childhood to higher education, and any educational sector from formal to non-formal and informal settings • Embody curricula with even greater efficiency developing Teaching Attainment Targets and Indicators of Competence for Environmental Citizenship <p>B. Development of learning materials</p> <ul style="list-style-type: none"> • Engage students in authentic controversial environmental socio-scientific issues that need a solution • Provide opportunities for students to act as environmental citizens • The EEC Pedagogical Approach could be implemented in both formal and non-formal settings as well as in different levels of education (e.g., primary and secondary). <p>C. Best practices</p> <p>Identify some best practices as successful learning materials, programmes and projects</p>
6.	Teacher's Professional Development	<p>TPD programs should:</p> <ul style="list-style-type: none"> • Aim to equip teachers with abilities and competences in order to be able to promote EEC • Include educational approaches that involve teachers in the process of solving authentic environmental problems • Include place-based practices that allow teachers to realise the scientific, social, economic, political and cultural dimensions of the environmental problems • Engage teachers in environmental action projects in the community that prompt them to critically assess the complexities, patterns and politics contained in environmental problems • Help teachers to clarify their own values and actions in terms of local and global environmental issues • Empower teachers to act as formative agents of Environmental Citizenship • Involve teachers in a progressive refinement of the understanding of the new ideas through cycles of co-design and learning from peers
7.	Educational Systems	A. Educational system level

		<p>B. School level</p> <ul style="list-style-type: none"> • Schools and educational institutions, including those from non-formal education settings such as environmental education centres and natural history museums, should adopt EEC in their daily educational practice • Once the importance of EEC is recognised, it could be integrated into school's environmental policy and promoted using a targeted strategic plan • Schools need to realise and accept their role and place in society as agents for change and in the transformation of the environment and society towards a more sustainable, responsible and fairer world • School communities should be aware of environmental issues and have the determination and ability to improve environmental conditions • In addition, school communities should not focus only on purely individual action but can act as members of a public that have shared obligations with others to address concerns about the environment and its resources for themselves, for the global community, for non-human life on earth, and for future generations • The establishment for synergies, partnerships and support from academic institutions, NGOs and other social actors could empower schools and educational institutions to adopt flexible mechanisms for integrating EEC • The adoption of environmental landscapes and ecosystems near the school will strengthen the relationships of the school with the local environment and the local communities, which will not only help students to understand their environment, what is affecting it and its problems, but also to develop participatory behaviours and actions of citizenship to solve these environmental problems <p>C. Classroom level</p>
8.	Evaluation	<p>An integrated measurement tool for Environmental Citizenship should be developed taking into consideration the different Knowledge, Skills and Competencies (e.g., Critical Thinking, Creativeness, Decision Making), Attitudes, Values (Anthropocentric, Biocentric, Ecocentric, Economic, Societal), Beliefs and Behaviours, Norms in the different cultural and contextual factors.</p> <p>The following research instruments have been selected as recommended instruments: <i>Environmental value of circular solutions</i>; <i>Environmental Citizenship Questionnaire</i>; <i>Student environmental citizenship</i>; <i>Green citizenship</i>; <i>Pro-environmental behavior</i>; <i>Self-transcendence and self-enhancement values</i>; <i>Sustainability Consciousness</i></p> <p>Here follows a description of two individual instruments and their relationship to Environmental Citizenship:</p>

		<p>A. Sustainability Consciousness</p> <p>The instrument: The questionnaire instrument measures knowingness (the recognition of the importance of a sustainable development), attitudes (the attitudes towards sustainable development) and self-reported behavior (the willingness to act towards a sustainable development) related to the three pillar model of sustainable development dimensions (environment, economy and society). The instrument exists in two versions; a long and a short. The long version (SCQ-L, 49 items) can be used to measure individuals' environmental, social and economic knowingness, attitudes and behavior (nine valid and reliable subscales). The short version (SCQ-S, 27 items) can be used to measure the second order constructs of sustainability knowingness, sustainability attitudes and sustainability behavior, as well as the third order construct, sustainability consciousness. The questionnaire was developed to match the UNESCO definition of sustainable development, and the items of the questionnaire correspond to this definition</p> <p>The relationship and coverage of aspects of Environmental Citizenship: The instrument includes items covering the three dimensions of sustainability; environment, economy and society. Each item also reflects either Knowledge, attitudes and behavior (see the inner circle of the EC-model in Figure 1. Sustainability Consciousness explicitly refer to these goals of Environmental Citizenship: <i>achieving sustainability, preventing environmental problems, solving environmental problems, addressing structural causes of environmental degradation, promoting intra- and inter-generational justice, achieving critical and active engagement & civic participation</i>. The sustainability Consciousness questionnaire investigates <i>individual actions</i> predominately in the <i>private sphere</i>, although also to some degree in the <i>public sphere</i>.</p> <p>Publication and further description of the instrument: Gericke, N., Boeve-de Pauw, J., Berglund, T. & Olsson, D. (2019). The Sustainability Consciousness Questionnaire: The theoretical development and empirical validation of an evaluation instrument for stakeholders working with sustainable development. <i>Sustainable Development</i>, 27(1), 35–49. DOI: 10.1002/sd.1859.</p> <p>B. Environmental Citizenship Questionnaire (ECQ)</p> <p>The instrument: The Environmental Citizenship Questionnaire (ECQ) can be used for assessing the environmental citizenship of secondary school students. The ECQ questionnaire can fill a gap in the literature as there is no questionnaire specific to Environmental Citizenship. So far, no comprehensive, holistic, and validated metric is available which assesses environmental citizenship. Only partial questionnaire items measuring political consumer behaviour (e.g. Micheletti et al.,) exist. This need became even greater after the comprehensive definition of 'environmental citizenship' by the European network for environmental citizenship involving more than 120 experts and researchers from 38 countries including Europe, Israel, and Australia.</p>
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		<p>The relationship and coverage of aspects of Environmental Citizenship: The ECQ provides a direct correlation of questioning items with the EEC Model's constituents by incorporating questioning items for knowledge, values, attitudes, skills, competences, and behaviours to assess environmental citizenship. ECQ also includes items on agents of change and possible individual and collective actions in the private and public spheres, inside and outside the school, as well as on different scales (local, national, and global).</p> <p>The ECQ can be used to assess environmental citizenship in different contexts but also to evaluate educational interventions if this validated tool is implemented before and after an educational intervention or an environmental education programme. It may also provide feedback on which environmental citizenship factors have been differentiated and which should be given greater emphasis and attention. In addition, ECQ can be used to compare results from different contexts, regions, and countries, different teaching practices (e.g. participatory action research, community-based learning), and in different types of education (e.g. formal, non-formal). In this case, of course, its effectiveness should be tested in different contexts, regions, and countries and with different age groups, with possible modifications that might be needed.</p> <p>Publication and further description of the instrument: Hadjichambis, C., & Paraskeva-Hadjichambi, D. (2020). Environmental Citizenship Questionnaire (ECQ): The development and validation of an evaluation instrument for secondary school students. <i>Sustainability</i>, 12(3), 821.</p>
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