ENEC report

Good examples and best educational practices leading to Environmental Citizenship

Deliverable 8

References:

Marie-Christine Knippels, Marta Romero Ariza, Jelle Boeve-de Pauw, Niklas Gericke, Demetra Paraskeva-Hadjichambis, Audrone Telesiene, Andri Christodoulou, Andreas Ch. Hadjichambis (2021). *Report on good examples and best educational practices leading to pro-environmental attitudes, behaviour and values*. European Network for Environmental Citizenship – ENEC Cost Action.

Good examples and best educational practices leading to Environmental Citizenship

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Grant holder institution:

Good examples and best educational practices leading to Environmental Citizenship

This document is the result of a collaborative effort of 134 scholars from 39 member states joined in the COST network ENEC, European Network for Environmental Citizenship. During the 5th and 6th COST-ENEC meeting the MC-members discussed good examples and educational practices that can lead to Environmental Citizenship. Each working group introduced, discussed and analysed a good example based on the dimensions set out in the framework for Education for Environmental Citizenship (EEC, Figure 1).

"Education for Environmental Citizenship" (ENEC, 2018) is defined as the type of education which 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" (EEC) is important to empower citizens to exercise 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, acting individually and collectively within democratic means and taking into account the inter- and intra-generational justice (ENEC 2018).
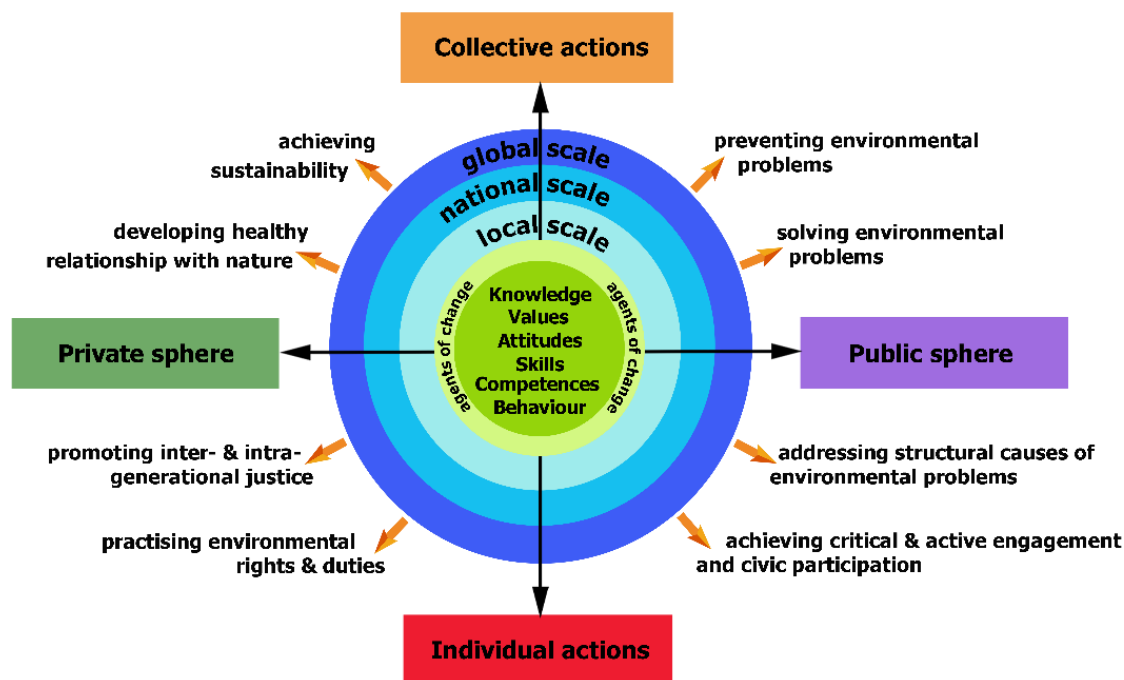
Figure 1. *Framework for Education for Environmental Citizenship (see Deliverable 21; Hadjichambis & Paraskeva-Hadjichambi, 2020)*

The ENEC working groups focus on Primary Formal education (WG1), Primary Non Formal education (WG2), Secondary Formal education (WG3) and Secondary Non Formal education (WG4). Leading questions in discussing and analysing the good examples per working group were:

- Which competences of EEC (knowledge, skills, values, attitudes, behaviours etc.) does the example address?
- Which aspects of EEC (political, social, economic, etc.) does the example address?
- Which dimensions (individual/collective) of EEC does the example address?
- Which spheres (private/public) of the EEC framework does the example address?
- Which scales (local/national/global) of the EEC framework Citizenship does the example address?
- Which outputs of EEC does the example address?
- Which Pedagogical stages of the Education for Environmental Citizenship does the example promote? The pedagogical stages refer to the EEC pedagogical approach as set out in Deliverable 21 (Figure 2).

Education for Environmental Citizenship Pedagogical Approach

INQUIRY
- Data collection & analysis
- Structural causes
- Inter- & Intra- generational injustice
- Value clarifications
- Outdoor activities

PLANNING ACTIONS
- Stakeholders interested
- Mapping controversy
- Alternative solutions
- Structural resistance
- Risk assessment

EVALUATION & REFLECTION
- Audit
- Measure
- Assess
- Inspect
- Focus

CIVIC PARTICIPATION
- Decision making
- Practice of Env. Right & Duties
- Actions in community
- Public debates
- Student activism

SUSTAIN ENVIRONMENTAL & SOCIAL CHANGE
- Support change
- Adopt
- Integrate to address structural causes
- Reward
- Inform

NETWORKING & SHARING IN SCALES
- From local to global
  - Local networks
  - National networks
  - Global networks

Figure 2. Education for Environmental Citizenship pedagogical approach (see Deliverable 21)

- Which are the Strengths for this resource for promoting EEC?
- Which are the challenges for developing EEC when implementing this resource (Good example)?

Per working group one good example will be presented and discussed, based on these guiding questions, in the sections below. Within this deliverable the focus is on highlighting examples and educational practices that can lead to Environmental Citizenship (EC). These examples and educational practices aim to *illustrate* how aspects of the EEC framework could be implemented in practice. They are not meant to represent the only way in which EEC can be enacted at the various educational levels. They highpoint in what ways the good examples can potentially lead to pro-environmental behaviours, attitudes and values.

Good example and best educational practice leading to Environmental Citizenship per working group

WG1 - Eco-Schools programme

'Eco-Schools' is a large global schools programme. Multiple schools around the world engage in the structured activities by the programme in order to develop their pupils pro-environmental attitudes and behaviours. The programme is inclusive and thus the activities extend to not only include the pupils and school communities, but also the local communities. As described by the Eco-Schools webpage, this programme consists of three structural elements: The Seven Steps Framework, the Eco-Schools Themes, and Assessment for the Green Flag. The programme requires support from school leaders and the Board and includes active involvement of staff[1]. To be able to showcase specific good practices of this large program, we chose the case of Llanmiloe Community Primary School from Wales (http://llanmiloe.amdro.org.uk/home/). In our studied case, the programme is funded by Welsh government and coordinated by "Keep Wales Tidy" National Office (https://www.keepwalestidy.cymru/our-schools).

Part 1: Brief Description of educational programme

- **Resource Short Name**: Eco-schools programme
- **Organization**:   Llanmiloe Community Primary School
- **Resource Full Name**:   Platinum Eco-school in Llanmiloe Community Primary School
- **Target group**:   pupils, their families, school staff and local authorities
- **Students Age**:   The Wales case study: Educational program for pre-primary and primary students. Min Age: 4 (Nursery); Max Age: 11 (Grade 6). For eco-schools in general: pupils starting from the pre-primary, to upper-secondary school age.
- **Country applied**: Wales, UK.
- **Resources Type**: formal education; whole-school project; cross-curriculum approach
- **Subject area**: multidisciplinary; main topics include: biodiversity, recycling, circular economy, STEM
- **Language of Resource**: English

Aim: "for schools to embark on a meaningful path towards improving the environment in both the school and the local community while at the same time having a life-long positive impact on the lives of young people, their families, school staff and local authorities." (https://www.ecoschools.global/how-does-it-work)

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[1] How Eco-Schools Work. Accessed on June 4th, 2021, through: https://www.ecoschools.global/how-does-it-work

Rationale: "The Eco-Schools programme consists of three structural elements - The Seven Steps Framework, the Eco-Schools Themes, and Assessment for the Green Flag. To be successful the programme requires support from school leaders and the Board." (https://www.ecoschools.global/how-does-it-work)

FEE EcoCampus 7 Step Methodology

Figure 3. Eco Schools Programme rationale: How eco-schools work (Source: https://www.ecoschools.global/how-does-it-work)

Activities used: The Eco-Schools program employs action based learning. Activities include Global action campaigns, e.g. "One Planet picnic"; regular learning within the outdoor area, e.g. "Outdoor Classroom Day", "Surf to Turf - Fundraising Cycle Ride"; Eco online activities, e.g. learning about fruits and vegetables from around the world.
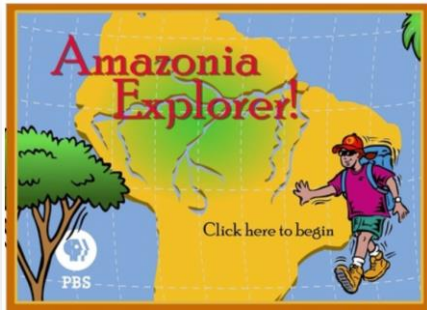

Figure 4. Students participating in an Outdoor Classroom Day (Source: Llanmiloe Community *Figure 5. Surf to Turf - Fundraising Cycle Ride (Source: Llanmiloe Community Primary School)*

Primary School)

Figure 6. *Example of eco online activity (Source: Llanmiloe Community Primary School)*

Figure 7. *Photo from Open Planet Picnic, Scotland (Source: https://www.ecoschools.global)*

Part 2: EEC dimensions and evaluation

2.1 EEC dimensions

Which competences of EEC does the example address?

Eco- schools programme is a broad spectrum programme. It is designed to improve the knowledge, to develop the skills, values and attitudes needed for the environmental citizenship, and it also helps the pupils to develop action competences and consequently – the environmentally significant behaviours.

Which aspects of EEC does the example address?

The Llanmiloe Community Primary School Platinum Eco-School helps to develop all the general competencies needed for the environmental citizenship. Yet its activities are more related to the social and the environmental aspects of the environmental citizenship. Environmental themes include, e.g. biodiversity, climate change, energy, food, school grounds, etc. The social topics include, e.g. global citizenship, health and wellbeing, etc. Political and economic topics are mostly avoided in this primary school, but this might be due to the age of the students.

Which dimensions of EEC does the example address?

The Llanmiloe Community Primary School platinum Eco-School example includes both – the individual and the collective dimensions of the EEC. The examples of the individual dimension include personal private sphere behaviours like gardening or recycling. Campaigning is a good example of the collective behaviours in the public sphere.

Which spheres of the EEC framework does the example address?

The studied case fosters active citizenship and pro-environmental lifestyles that include both – the private and the public spheres. Pupils and the teachers alike are encouraged to change in their daily

lifestyles at home (private sphere). But they also make plans and implement some of the environmental management decisions at school, or go campaigning in their home-town (those are examples of public spheres).

Which scales of the EEC framework Citizenship does the example address?

The example mostly addresses local and global scales. The school has both – global action days, and the activities dedicated to the exploration of school grounds and environments. National focus is somewhat missing from the program (as implemented in the studied case).

Which outputs of EEC does the example address?

The Eco-Schools programme, as implemented by The Llanmiloe Community Primary School, helps preventing new environmental problems (because target groups learn new modes of environmentally friendly behaviours). One of its major outputs is also related to the fact that the programme's content addresses structural causes of environmental problems (pupils learn about these). Through whole-school approach and active involvement of teachers and pupils, it also fosters critical & active engagement and civic participation. Finally, it develops healthy relationship with nature. All these outputs are equally important in terms of the environmental citizenship.

Which Pedagogical stages of the Education for Environmental Citizenship does the example promote/cultivate?

The studied school cultivates these pedagogical strategies and stages: inquiry; planning actions; civic participation; networking and sharing in scales.

2.2 Evaluation

Which are the strengths for this resource for promoting EEC?

One of the main strengths is the whole-school approach. It avoids fragmentation and allows for cooperation on the goals of the program. Especially important is the active role of teachers because the involvement of students critically relies on them.

Being part of a huge global Eco-schools network brings its own benefits. The program has clear strategies, methodologies, examples, online didactic resources and schemes to motivation. These all support the continuous involvement of schools and pupils. Because there are clear steps and stages to go forward, it produces high motivation (inner incentive) and engagement.

Eco-school program has available Support and Tools for teachers or other community members. These include, e.g. lesson plans, inspirational stories, webinars, information resources, etc.

The programme gives incentives to work with community. This is a collaborative endeavour. By reaching out to the local community and local authorities, the pupils extend their activities and reach more households. This results in a community level spill over of environment friendly behaviours.

Learning outside is another strength of the studied example. This hands-on approach to learning helps to develop connectedness to the local environment. Nature connectedness is a powerful factor behind the development of an environmental citizenship.

Pupils are able to acquire a useful knowledge of ecology and sustainability whilst developing communication skills by sharing this knowledge with others as well as developing literacy and numeracy skills in an outdoor context.

Which are the challenges for developing EEC when implementing this example?

Participation in the Eco-schools programme sometimes creates competition among schools. This competitive nature of the programme might result in things being done just for the sake of the competition.

Another challenge is related to an instrumental thinking. It might be the case that schools do the developmental stages to get funding but are not driven by inner motivations (not necessarily in this particular case, but in general).

A stronger emphasis might be placed on political action, for instance encouraging kids to write letters to the town hall to address a local problem, improve a particular area or implement measures to enhance pro-environmental behaviours.

Helping kids to become aware of the impact of their individual actions and their capacity to participate in join actions and to campaign for promoting change for the better would allow them to exercise their rights and duties as environmental citizens.

Further development of the programme in the Llanmiloe Community Primary School might include more action on a national scale. This might be achieved by planning and participating in networking events for eco-schools on a national level.

A stronger emphasis on reflection and discussion is needed. It would allow kids to identify the structural causes of environmental problems, even though they are primary school kids. Explicit reflection of the importance of biodiversity and nature protection not just for today's citizens but also for future generations, would allow them to become aware of the importance of intra and inter-generational justice.

There is scientific evidence for showing that the programme addresses the environmental knowledge well, but fails to impact the pupils attitudes (Krnel, Naglic, 2009), does not influence the environmental affect (Boeve-de Pauw, Van Petegem, 2011) or preservation values (Boeve-de Pauw, Van Petegem, 2013) and therefore, there is a need for developing a better understanding of what are the key factors involved in getting a significant and lasting impact on people's values, beliefs and behaviours. There is also a need for further research on how the Eco-Schools programme might improve to address more lasting attitudinal, value, and behavioural changes.

A higher engagement and a more long-lasting impact might be achieved by focusing not just on preventing environmental problems but also on solving current ones making kids to develop the sense of ownership and empowerment and helping them to exercise their duties and rights as environmental citizens.

WG2 – VALIES, Belgium

In the context of the VALIES project multiple projects were developed and implemented by the school teams of about 50 schools in Flanders, supported by a VALIES coach and studied by VALIES researchers. All schools took part in a teacher professional development course that focussed on delivering input to school teams, sharing experiences on the implementation of education for environmental citizenship and on co-designing interventions for each school. The didactical model of Holism-Pluralism-Action lay at the basis of the TPD course. See also Sinakou at al. (2020). This 'good example' is whole-school practice that was developed and implemented by one of the participating primary schools.

Part 1 - Brief Description of educational programme

- **Resource Short Name:** The world is a wonder
- **Organization:** VALIES
- **Resource Full Name:** The world is a wonder – a whole school project on Holism, Pluralism and Action
- **Students Age:** 6-12
- **Original Language of Resource:** Dutch
- **Country applied:** Belgium
- **Resources Type:** Whole-school project
- **Subject area:** Climate change

Part 2 - EEC dimensions and evaluation

1. Which competences of the Green Cycle does the Resource promote/cultivate?

Like all the projects developed by schools within the VALIES project, the 'The world is a wonder' project focusses on a balanced development of all components of 'action competence'. This concept relates to all the competencies listed in the EC-model: it seeks to balance 'knowledge of action possibilities', with 'confidence in once own influence' and 'willingness to act (Sass et al., 2020). Throughout the design and implementation of the project, the teachers focussed on opportunities for each of these competences to develop in the participating children.

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Photo 1. *The school team taking part in the TPD, collaborating of project*

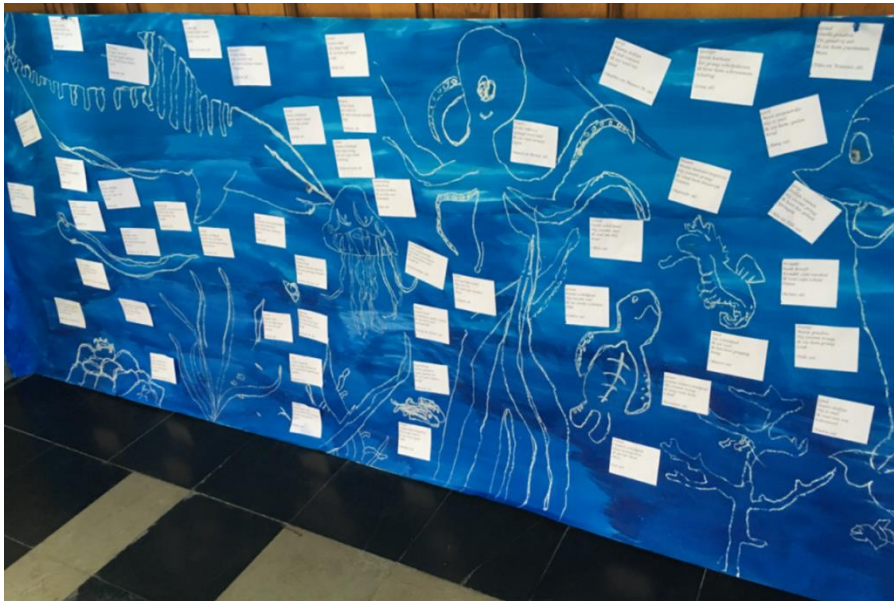## 2. Which aspects of the Environmental Citizenship does the Resource promote/cultivate?

Environmental Citizenship General. To maximize learning opportunities for all students, the school team developed specific subproject for each age group. The pre-schoolers (2-5 year-olds) in kindergarten focused on 'Fun with bottles', and primarily discovered how bottles can be used and what they are made of. Kids in grades 1&2 (6-8) year-olds) focussed on water, kids from grades 3&4 (8-10 year olds) on waste prevention, and kids from grades 5&6 (10 to 12 year olds) on climate change. Within each project the teacher built in learning events that triggered the students to understand the issue at a level of complexity suited for their age, to see diverse stakeholders' connection to the issue, and to think of a bring into action real solutions within their own sphere of influence.

Photo 2. *Creative mapping of project ideas, relating to the SDGs*

Photo 3. *Visualisation of the complexity of climate change, made by the children*

3. Which Dimensions of the Education for Environmental Citizenship does the Resource promote?

Individual and collective action. Students (especially those from grades 5 and 6) were invited to design action that were either individual or collective, and that could make a direct or indirect contribution to preventing climate change.

Photo 4. *The children on a their own locally organised climate strike*

4. Which Spheres of the Education for Environmental Citizenship does the Resource promote?

Both private and public actions were designed by the children. Furthermore, actions were shared with the local community through on open school day were children presented their ideas and action, and invited adults to join in also make contributions. The actions included a private dimension, focussed on diminishing the students' own ecological footprint and public dimensions through organising a local strike for the climate (for which the invited the town's major) and the design keychains that were handed out the drivers in cars loitering around the school (mainly with parents of the school children).

5. Which Scales of the Education for Environmental Citizenship does the Resource promote?

All the actions were for focussed at the local scale. This is a meaningful results of the pedagogy that teacher implemented and where they aimed to created significant life experiences for the children. Mastery experiences in a local real context help build these young students' self-efficacy and as such contribute to developing their action competence.

6. Which Outputs of the Education for Environmental Citizenship does the Resource promote?

All actions were focussed on preventing new environmental problems.

7. Which Pedagogical stages of the EEC model does the Resource promote?

All six stages were included in this project. Especially for the students from grades 5 and 6, the project began from an inquiry stage with students studying the causes of climate change and how it manifests itself in diverse forms locally, formulating their own research questions, and explaining key concepts (such as the ecological footprint) to each other. They then mapped what they had learned and what they wanted to get to know even more on mood boards that illustrated interconnections and complexity as well of their own emotions regarding the subject. In art projects they visualized their own ecological foot print and that of famous people. Several students collaborated to design a survey which they used to identify how (300+) people living in their neighbourhoods understand, relate to and feel about climate change. This input was used by the students to design and plan actions based on real data. As sketched above, the actions the students' designed and brought into practice were both in the private and public sphere. Finally it should also be mentioned that the process and results of the whole project were shared with the outside world through a movie that the children directed about the project, and which was distributed through social media to local stakeholders (municipality, parents, adjacent schools etc.). Through the collaboration with the VALIES researchers, evaluation of learning outcomes was possible for the participating children. The school team received a report visualizing data from a pre-post intervention study that showed how the children evolved across the academic year in terms of their action competence.

Photo 5. *Visualisation of the key concept ecological footprint, made by the children*

Photo 6. *The children make the local news*

8. Which are the Strengths and Opportunities of the Resource (Good example)?

A clear strength is the fact that the project was locally inspired, so the children can immediately see relevance in their own lives and take the impact of their own action. The students were in the driver's seat in this project, allowing them to feel and take ownership over the action they developed themselves. The project also allowed for kids to use their own and diverse talents and interests: role was distributed and not all students took part in each stage of the EEC model. There was also the potential of immediate feedback – from parents, community members and local government. The project furthermore made use of the ESD-effective school framework to facilitate shared vision and sustainability (anchoring) within the school (Verhelst et al., 2020).

9. Which are the Weak points of the Resource (Good example)?

There may have been a self-selection bias. All schools that participated in VALIES were school that were motivated to do so. This may skews the understanding in terms of transferability and scaling. There was, however, also report by the school team of a need to deal with resistant colleagues within school. The locally inspired nature might be both a strength and a weakness, since it may present a limitation in terms of adaptation to other circumstances. If other schools aim to implement this project they cannot just take in off the shelve.

WG3 – The Junk Lab, Sweden

The Keep Sweden Tidy Foundation is a non-profit organization that promotes recycling and combats litter through public awareness campaigns and environmental education initiatives and resources. The Foundation was founded in 1983 by the Swedish Environmental Protection Agency and the company Returpack. Its origins, however, is in the Keep Nature Tidy campaign that was launched in 1963 by the Swedish Society for Nature Conservation. The organization is responsible for the Green Flag certification system of schools and pre-schools in Sweden and provides teaching resources for education for sustainable development (Gericke et al., 2020). Here we present one of their digital resources as a 'good example' that are available on the internet. The resource is named 'the junk lab' (Swedish 'skräpplabbet') and can be found here: https://skraplabbet.se/. In this resource the teacher can organise teaching by using a number of student assignments and tasks that are available in the teacher's room of the website related to the problem of littering. The assignments are then enacted in the virtual classroom, as well as in the real classroom and outside school (see photos).

Photo 7. Here is the start page of the Junk Lab. From here you can enter 'the teacher's room', 'the class room' or 'the pre-school'.
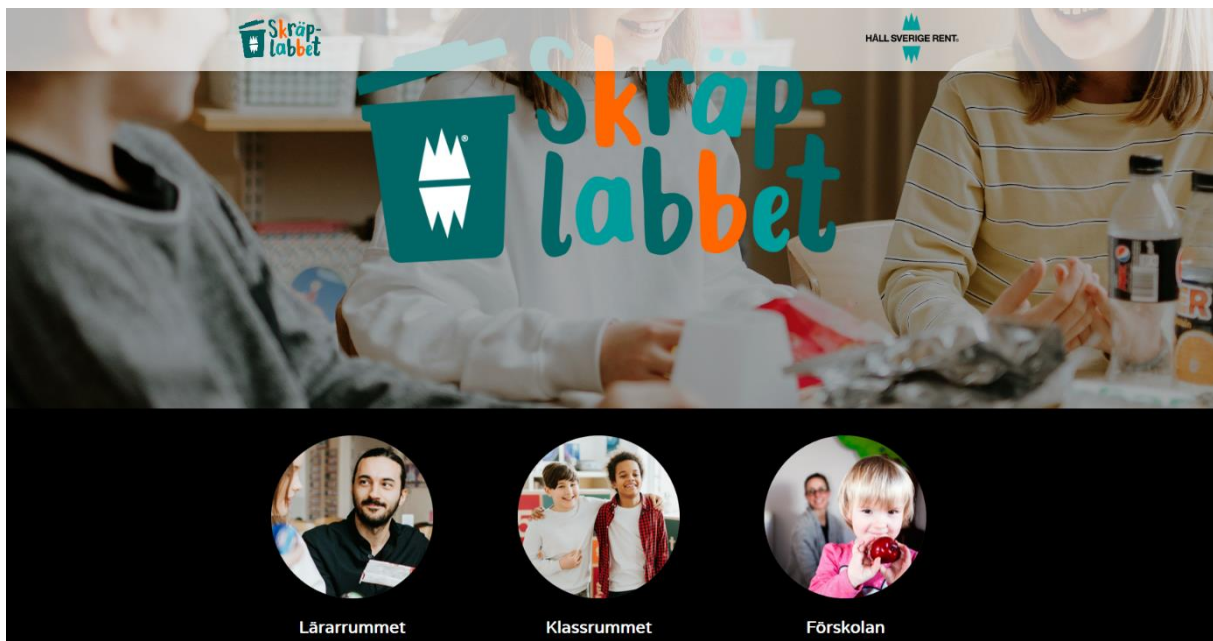
Part 1 - Brief Description of educational programme

- **Resource Short Name:** The Junk Lab
- **Organization:** The Keep Sweden Tidy Foundation [Håll Sverige Rent]
- **Resource Full Name:** School and pre-school – The Junk Lab
- **Students Age:** K-12
- **Original Language of Resource:** Swedish

- **Country applied:** Sweden
- **Resources Type:** Digital resource for teaching
- **Subject area:** Littering

Part 2 - EEC dimensions and evaluation

1. Which competences of the Green Cycle does the Resource promote/cultivate?

The Junk Lab is a solution-oriented knowledge resource about littering. Here, the students gain concrete knowledge about the human impact on nature, but also about the potential of junk and litter as a valuable resource. The overall aim of the Junk Lab is to engage and make the students aware and action oriented, i.e. to develop an overall action competence for sustainability (Sass et al., 2020). This concept relates to all the elements of the personal development included in the EC-model (Hadjichambis & Paraskeva-Hadjichambi, 2020), i.e. knowledge, values, attitudes, skills, competences and behaviours.

2. Which aspects of the Environmental Citizenship does the Resource promote/cultivate?

The Junk Lab addresses Environmental Citizenship in general. The key focus is on the environmental perspective, but the social aspects of environmental citizenship are also included. The content is divided into four themes: "human", "city", "ocean" and "nature". In these four themes, the human impact on nature is addressed providing bio-centric perspectives on human activities. The overall focus is on sustainability by addressing structural causes of environmental problems.

Photo 8. In the teacher room you can select of four themes, 'human', 'city', 'ocean' or 'nature'.

3. Which Dimensions of the Education for Environmental Citizenship does the Resource promote?

Individual and collective action. Students (at all school levels from pre-school to upper secondary school) are invited to take part in action oriented teaching designs that reflects both individual and collective actions, and that could make a direct or indirect contribution to prevent environmental problems.

4. Which Spheres of the Education for Environmental Citizenship does the Resource promote?

Public actions are included in the teaching design in the different assignments for the students in the digital module. Furthermore, actions are shared with the local community in the activities for the older students of secondary school, for which litter collection activities in the local community outside the school is included. In all the activities students need to address value related issues both to the private as well as the public sphere.

5. Which Scales of the Education for Environmental Citizenship does the Resource promote?

All the actions are designed to be enacted at the local scale at the school and community level. This is a meaningful way to engage the youth in their local context. However, the effects of the actions are related to sustainable global issues such as polluted oceans, climate change and biodiversity. It is more practical for the teacher to enact teaching locally from a professional perspective, and by creating significant life experiences for the students, in a local real context, it facilitates the development of the students action competence for sustainability.

6. Which Outputs of the Education for Environmental Citizenship does the Resource promote?

The Junk Lab addresses structural environmental problems and how they can be prevented or solved. In addition, all the tasks for the students in the digital resource are related to the Sustainable Development Goals (UNESCO, 2017), and follow an overarching sustainability framework addressing also the social and economic dimensions of sustainability. In some of the tasks the students are asked to practice duties from a citizenship perspective by collaborating in work for the public benefit relating to littering.

7. Which Pedagogical stages of the EEC model does the Resource promote?

Five of the six stages of the EEC-model can be found in the Junk Lab: "inquiry", "planning actions", "civic participation", "sustain environmental and social change" and "evaluation and reflection". However, the aspect of "networking and sharing" is less emphasized in the resource. In many of the assignments that the students are expected to do in the teaching activities there is an element of inquiry, and the students should find something out. For example, the students should find out what differ disposable plastic from reused plastics. They should plan actions, like designing and building trash cans. And they should translate this into civic participation by collecting litter in their neighbourhood. Social aspects and evaluation of the teaching activities are present in most teaching

assignments, and students should reflect using knowledge as well as values in relation to their actions.

8. Which are the Strengths and Opportunities of the Resource (Good example)?

The Junk Lab has many strengths from a teaching perspective. First, the resources are available for teachers and their students easily on the internet. By the digital design, the resource can be used in a flexible way by the teachers and easily integrated in their ordinary teaching. For example, the teacher can build their own electronic classroom and create a learning trajectory of their own. Further, all the tasks and assignments in the resource are explicitly linked to teaching goals of the Swedish National Curricula (Education, 2011) as well as the Sustainable Development Goals (UNESCO, 2017). In that way a teacher can easily teach for Environmental Citizenship while at the same time work towards other goals of the formal curricula. A range of resources are used in the Junk Lab, representing both digital and other modalities, which make the learning environment presumably interesting for students.

Photo 9. *In the classroom there are many resources such as films (see below) and texts for the pupils to use.*
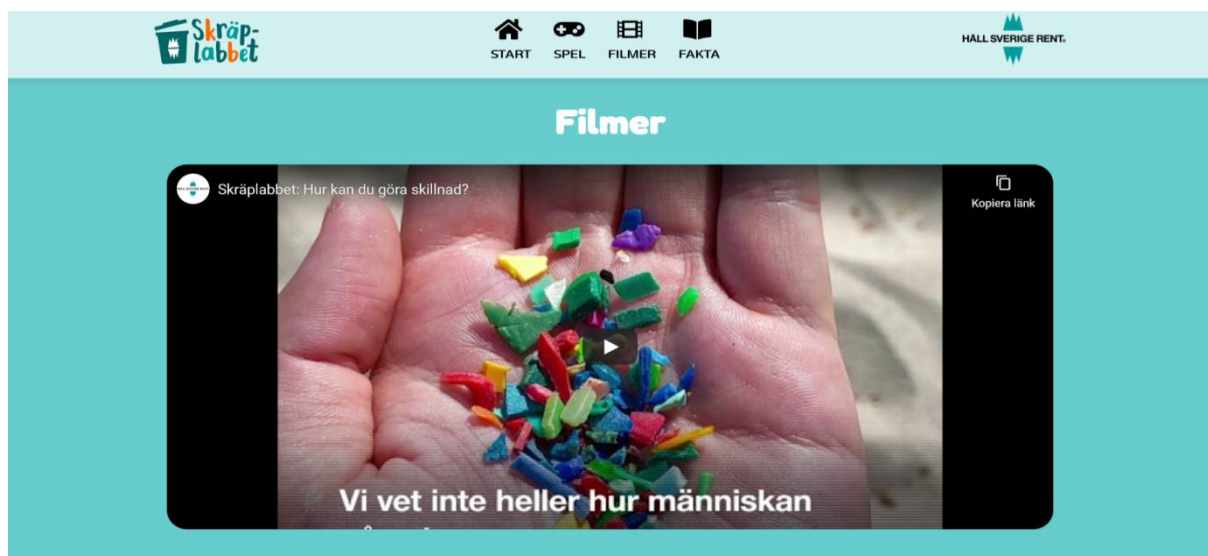
9. Which are the Weak points of the Resource (Good example)?

Because the Junk Lab is based on predefined problems, which the teachers and students enact in their teaching and local environment, issues of relevance might be posed. There are very few possibilities for the students themselves to identify the environmental and sustainability problems and start from their own queries. This might reduce the relevance, which can be a downside if the aim is to develop action competence, for which the willingness to act is an important aspect (Sass et al., 2020).

WG4 – Active Citizens, Cyprus

Education for Environmental Citizenship, as was defined by ENEC (2018), has a lot to contribute to the education of the future environmental citizens. The Education for Environmental Citizenship pedagogical approach (Hadjichambis & Paraskeva-Hadjichambi, 2020) is an integrated and comprehensive tool which includes stages and steps designed to promote Education for Environmental Citizenship (EEC) (see Figure 2). The approach recommends specific elements as stages (Inquiry, Planning actions, Civic participation, Networking & Sharing in Scales, Sustain Environmental & Social Change, and Evaluation & Reflection) and several steps, but it is not mandatory to follow all of them, or to be applied in a particular linear order. Depending on the environmental problem under study, the level of education (e.g., primary or secondary) and the educational settings (e.g. formal or non-formal), the necessary differentiations and adaptations can be made.

This learning intervention was designed based on the Education for Environmental Citizenship pedagogical approach and was implemented in 10th grade biology students (15–16 years old). The learning intervention was implemented as a project embedded in Biology lessons with duration 4 months. Students were given the opportunity to participate in several activities related to the 6 stages (and several steps) of EEC Pedagogical Approach.

Part 1 - Brief Description of educational programme

- **Resource Short Name:** Active Citizens
- **Organization:** Cyprus Center for Environmental Research and Educations
- **Resource Full Name:** Active Citizens
- **Students Age:** 15-18 years old, upper secondary school
- **Original Language of Resource:** Greek
- **Country applied:** Cyprus
- **Resources Type:** Learning intervention
- **Subject area:** Biology / Environmental Citizenship

The learning intervention started with a local environmental problem. The environmental problem studied was related to the development of a Casino Resort nearby a protected wetland which supports a lot of endangered species. This problem was selected by the students since this issue was faced by the community in which students' school

Figure 8: The proposed development

was located and were motivated to act as environmental citizens to help solving it.

During the first stage, <u>Inquiry</u>, students were given the opportunity to collect data and proceed with their analysis, so that they can understand the different dimensions of the problem. The collection of scientific data was the starting point for students in order to develop and support their argumentation towards problem solution. They were also given the opportunity to examine the structural causes of the environmental problem for example, identified behind the problem ineffective environmental laws and ineffective procedures for nature conservation and also conflicting interests for a prioritization of economic development over environmental protection. Students were also prompted to identify the values driving different stakeholders (e.g., developers, ecologists) relevant to the environmental problem. For example, what values were hidden behind the positions of the various stakeholders (eg developers, students, environmentalists, etc.). Finally, students were given the opportunity to visit the site in which the problem exist and took part in outdoor and place- based activities in the field.

Figure 9: Inquiry- Data collection

Figure 10: Inquiry-Place-based activities

During the second stage of EEC approach, <u>Planning Actions</u>, students were given the opportunity to record the stakeholders' interests to the environmental problem under study (developers, environmentalists, students, politicians, the government, the community). In a next step, they attempted to map the stakeholder controversy by elaborating the arguments for or against a proposed solution. By decoding the controversy, students realized the complexity of the environmental problem

Figure 11: Planning actions-Mapping the controversy

studied and started to design solutions that take into account the conflicting interests of the actors involved.

During the third stage of EEC approach, Civic Participation, students were given the opportunity to be actively involved in decision-making. In this step, students explored the alternatives they identified in the previous stage and came to their decision about the best solution. They decided to share their decision and suggestions about the optimum alternative with scientists (bird life Cyprus), environmental organizations (CYCERE) and other stakeholders. Students also participated in a campaign and attempted to inform community about their suggestions.

Figure 12: Civic Participation-Campaign in community

During the fourth stage of EEC approach, Networking & Sharing in Scales, students attempted to maximize their impact by organizing local networks by involving other classmates, teachers, some experts and members of the community. Thus students attempted to influence decisions in their community and be a lever of pressure on their community to realize the importance of solving the specific environmental problem, and also highlight the importance of precautionary principle in order to avoid creating other similar problems. In this frame students presented their work and suggestions in the 4th National Ecological

Figure 13: Networking and Sharing in scales -Presentation in a National Conference

Conference in which more than 500 students, 100 teachers and decades of stakeholders were participated.

In order to apply the fifth stage of EEC approach, Sustain Environmental & Social Change, students attempted to make complementary efforts to sustain environmental and social change. Students were given the opportunity to support and improve previous actions. They continued discussing the issue for an extra period of time and they participated in a Radio broadcast in a local channel.

Figure 14: Sustain Environmental & Social Change – Radio Broadcast

Finally, students through the sixth stage of the EEC approach, Evaluation & Reflection, attempted to evaluate the success of the several actions implemented by collaborating with their teachers to create research tools to measure different competencies (eg knowledge of students before and after the intervention, attitudes of students before and after, values of stakeholders or the community, skills and abilities). Students also identified the pros and cons from the implementation of the approach and proposed improvements of the process followed of resolving an environmental issue to be applied in next efforts.

Figure 15: Evaluation & Reflection

Part 2 – EEC dimensions and evaluation

2.1 EEC dimensions

Which competences of EEC (knowledge, skills, values, attitudes, behaviours etc.) does the example address?

Several competences of the EEC Pedagogical Approach are promoted:

- Knowledge
- Skills (scientific oriented skills / Citizenship skills)
- Competencies
- Behaviours
- Values
- Attitudes
- Intentions to act inside and outside schools
- Communication skills
- Team work
- Technological skills

Which aspects of EEC (political, social, economic, etc.) does the example address?

- Social Aspects of Environmental Citizenship
- Environmental Citizenship in General (talk to radio, talk to their classmates)

Which dimensions (individual/collective) of EEC does the example address?

- Individual actions
- Collective actions

Which spheres (private/public) of the EEC framework does the example address?

- Actions in Private sphere (e.g. inform their families)
- Actions in Public sphere (e.g. presentation on the National Conference, media, a letter to the Mayor of Limassol)

Which scales (local/national/global) of the EEC framework Citizenship does the example address?

- Actions in Local scale (e.g. campaign in community)
- Actions in National scale (e.g. presentation in a National Conference)

Which outputs of EEC does the example address?

- Preventing new environmental problems (e.g. increase mitigation measures)
- Addressing structural causes of environmental problems (e.g. realise financial issues behind decisions).
- Achieving critical & active engagement and civic participation (e.g. present optimum alternative option to community)
- Practising environmental rights & duties

Which Pedagogical stages of the Education for Environmental Citizenship does the example promote/cultivate?

The learning intervention follows all stages (and several steps) of the EEC approach:

- Inquiry
- Planning actions
- Civic participation
- Sharing and networking
- Sustain environmental & social change [radio broadcast]
- Evaluation and reflection

2.2 Evaluation

Which are the Strengths for this resource for promoting EEC?

- Experiential learning
- Real world education
- Place-based education
- Youth inclusion in environmental issues
- Youth awareness because students went through Environmental Impact Assessment study - Higher cognitive skills
- Cooperation with stakeholders
- Team work - key point in Environmental Issues
- A lot of the outdoor learning was situated in the site it self
- The students were active in selecting the problem for study and was not given to them. It was not a top down decision.

Which are the challenges for developing EEC when implementing this resource (Good example)?

(What are the areas of development for addressing EEC when implementing this resource?)

1. It was carried out by Biology class and not cross-curricular in the school curriculum. More interdisciplinarity is needed.
2. The learners should be active in selecting the environmental issue that would like to study, in order to be more engaged.
3. Teamwork and collecting actions.
4. Interdisciplinary approach and interdisciplinary group of teachers and transdisciplinary, not only teachers and other stakeholder.
5. Many secondary school biology teachers feel the need to improve their competence regarding fostering this form of scientific citizenship.
6. Biology teachers express a need for supportive educational materials, tools, action strategies and assessment options to successfully integrate environmental citizenship education in their science lessons, thus fostering critical citizenship in their students.

Part 3 – Evaluation of the learning intervention

The learning intervention was evaluated through a structured validated questionnaire. Some insights from the evaluation are presented below.

The evaluation focused on the impact of the described learning intervention on 10th grade biology students (15–16 years old) based on the Education for Environmental Citizenship pedagogical approach. The learning intervention was implemented as a project embedded in Biology lessons with duration 4 months.

Sample: A sample of 50 students participated comprised of 29 girls (58%) and 21 boys (42%), from 2 classrooms. Students were of mixed academic ability according to the national educational practices. Each classroom included students whose cognitive abilities ranged from high-average to low-average, as well as some highly-gifted students. The Environmental Citizenship Questionnaire (ECQ) (Hadjichambis & Paraskeva-Hadjichambi, 2019) was employed for data collection and applied before (pre-) and after (post-) the learning intervention. The ECQ was composed by nine (9) closed-ended questions including 76 items.

The main research questions were:
1. How students' past and present actions as Environmental Citizens were differentiated after the implementation of the EEC Pedagogical Approach?
2. How students' competences (knowledge, conceptions, skills, values, attitudes) as Environmental Citizens differentiated after the implementation of the EEC Pedagogical Approach?
3. How students' intention to act in the future as Environmental Citizens differentiated after the implementation of the EEC Pedagogical Approach?

Data Collection: The Environmental Citizenship Questionnaire (ECQ) was applied before and after (the learning intervention. ECQ which was validated in another study (Hadjichambis & Paraskeva-Hadjichambi, 2020), was composed by nine (9) closed-ended questions including 76 items (Figure 16).
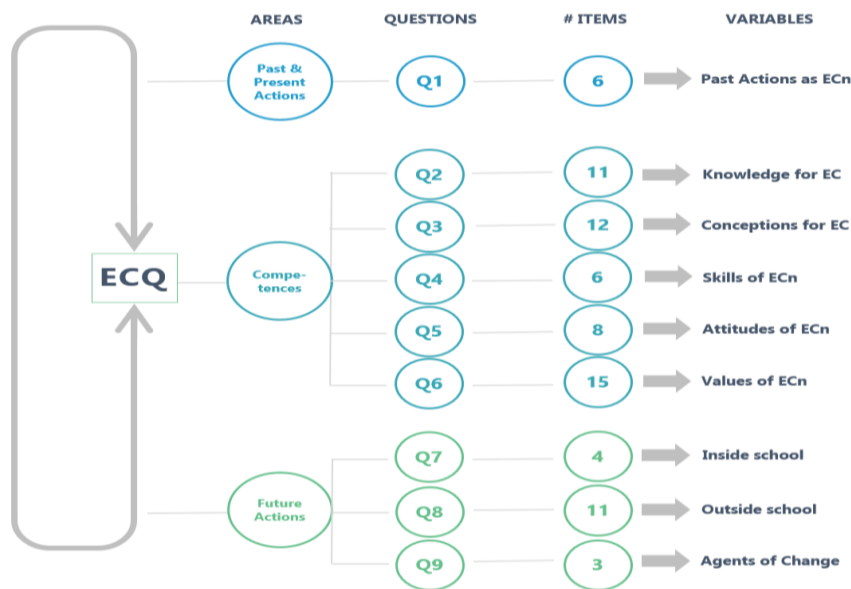
Figure 16: *The ECQ structure*

Data analysis: T-test for paired samples was employed in order to compare if there were any statistically significant differences between students pre- and post-tests regarding the 9 variables.

The Pearson's product-moment correlation coefficient was used to investigate possible significant relationships between attitudes, values and future actions.

Findings: According to the results of the pre-test the majority of the students were scarcely been involved in activities with environmental organizations or groups outside school, while at school were not given many opportunities to get familiar with ways of preventing or solving environmental problems, practicing environmental rights and duties or actively participate in society. Furthermore, inside schools only to a small extent have learned how to act and networking in a national (country) level and a global level. Those parameters were considerably improved in the post-test. In addition, after their involvement in the learning intervention, students were statistically proved to develop many skills as environmental citizens such as discussing a newspaper article about environmental conflicts, arguing about controversial environmental issues as well as speaking in front of their class about environmental topics. Worth noticing outcomes were arise after the EEC pedagogical approach intervention, regarding their intention to act in the future as students as well as agents of change. As future citizens there was a statistically significant increase in their intention to talk to others about environmental issues, contribute to online discussion forums about environmental issues as well as take part in peaceful march.

The paired t-test for two dependent samples, revealed a significant difference in all questions before and after the educational intervention. In Table 1 can be seen that Mean scores increase considerably revealing greater empowerment of students as environmental citizens in Past, Present and Future actions as well as in competences.

Table 1: *Means, standard deviations and paired t-values derived from comparisons between before and after intervention for each factor.*

Difference Pre / Post	Mean	S. D.	t	p
Past/present actions as ECn	0,88	0,42	14,75	<0,001***
Knowledge for ECn	0,75	0,46	11,45	<0,001***
Conceptions for ECn	0,36	0,40	6,40	<0,001***
Skills of ECn	0,34	0,42	5,75	<0,001***
Attitudes of ECn	0,21	0,28	5,27	<0,001***
Values of ECn	0,09	0,21	3,02	0,004***
Future actions inside school	0,31	0,46	4,78	<0,001***
Future actions outside school	0,32	0,35	6,52	<0,001***
Agents of change	0,28	0,39	5,09	<0,001***

***p<0,001, ** p<0,01, *p<0,05

The Pearson's product-moment correlation coefficient revealed significant relationships between attitudes, values and future actions (Table 2).

Table 2: *Pearson's correlation matrix, for Questions 5-9 after intervention*

	Attitudes of ECn	Values of ECn	Future actions in school	Future actions outside school	Agents of change
Attitudes of ECn	1	,438**	,612**	,595**	,559**
Values of ECn	50	1	,575**	,474**	,375**
Future actions inside school	50	50	1	,769**	,677**
Future actions outside school	50	50	50	1	,715**
Agents of change	50	50	50	50	1

***p<0,001, ** p<0,01, *p<0,05

Conclusions: The EEC Pedagogical Approach could contribute to the empowerment of students into active environmental citizens.
The ECQ questionnaire can be a reliable tool for measuring Environmental Citizenship
More empirical studies could shed light to the effectiveness of the EEC Pedagogical Approach or other approaches in promoting Environmental Citizenship

References

Boeve-de Pauw, J., & Van Petegem, P. (2011). The effect of Flemish eco-schools on student environmental knowledge, attitudes, and affect. *International Journal of Science Education*, 33(11), 1513-1538.

Boeve-de Pauw, J., & Van Petegem, P. (2013). The effect of eco-schools on children's environmental values and behaviour. *Journal of Biological Education*, 47(2), 96-103.

Education, T. S. N. A. f. 2011. Curriculum for the compulsory school, preschool class and the leisure-time centre 2011 In. Retrieved from http://www.skolverket.se/2.3894/in_english/publications

European Network for Environmental Citizenship – ENEC (2018). Defining "Education for Environmental Citizenship". Retrieved from http://enec-cost.eu/our-approach/education-for-environmental-citizenship/ .

Gericke, N., Manni, A., & Stagell, U. (2020). The Green School Movement in Sweden – past, present and future. In A. Gough, J.C. Lee & E.P.K. Tsang (Eds.), *Green Schools Movements Around the World: Stories of Impact on Education for Sustainable Development* (pp. 309-332). Cham, Switzerland: Springer.

Hadjichambis A. & Paraskeva-Hadjichambi, D. (2020). Environmental Citizenship in Secondary Formal Education: The Importance of Curriculum and Subject Teachers. In: A. Hadjichambis, D. Hadjichambis, P. Reis, J. Cincera, J. Boeve-de Pauw, N. Gericke & M.C. Knippels (Eds). *Conceptualizing Environmental Citizenship for 21st Century Education* (pp. 237-261). Environmental Discourses in Science Education, vol 4. Cham, Switzerland: Springer.

Hadjichambis, A. Ch. & Paraskeva-Hadjichambi D. (2020). Environmental Citizenship Questionnaire (ECQ): the development and validation of an evaluation instrument for secondary school students, *Sustainability*, *12*, 821.

Hadjichambis, A. Ch. & Paraskeva-Hadjichambi D. (2020). Education for Environmental Citizenship: the pedagogical approach. In: A. Hadjichambis, D. Hadjichambis, P. Reis, J. Cincera, J. Boeve-de Pauw, N. Gericke & M.C. Knippels (Eds). *Conceptualizing environmental citizenship for 21st century education (*pp. 260-290). Cham, Switzerland: Springer.

Krnel, D., & Naglic, S. (2009). Environmental literacy comparison between eco-schools and ordinary schools in Slovenia. *Science Education International*, 20, 5-24.

Sass, W., Boeve-de Pauw, J., Olsson, D., Gericke, N. & Maeyer, S. (2020). Redefining action competence: The case of sustainable development. *Journal of Environmental Education*, 51(4), 292-305.

Sinakou, E., Donche, V., Boeve-de Pauw, J., & Van Petegem, P (2020). Designing powerful learning environments in education for sustainable development: A conceptual framework. *Sustainability*, *11*, 5994.

UNESCO (2017). *UNESCO Global Action Programme on Education for Sustainable Development; Information Folder*. UNESCO: Paris, France,

Verhelst, D., Vanhoof, J., Boeve-de Pauw, J., & Van Petegem, P. (2020). Building a conceptual framework for the ESD-effective school. *Environmental Education Research, 51*(6), 400-415.