

# STATE OF THE ART REPORT

JUNE 2018

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Promoting Green Skills  
Through Games

Draft Version

Project Code

Lifelong Learning Programme

and Culture DG

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## 1. INTRODUCTION

This report includes the analysis carried out in relation to the state of the art of environmental and sustainable education in the involved partner countries.

This analysis is the result of OUTPUT 1 led by Prospektiker and it has been conceived under the ERASMUS+ “Promoting Green Skills Through Games” project, with the participation of 5 partners from 5 countries (Austria, Croatia, Ireland, Spain and UK).

The overall objective of the “Promoting Green Skills Through Games” project is to develop a digital game, associated resources and learning platform, as well as related synchronous and asynchronous training for teachers to complement, or help institute, the teaching of, and facilitate the understanding of, sustainable education and to advocate attitudinal change and endorsement of relevant environmental values in primary and secondary level education.

Within this framework, the aim of this state of the art analysis is to identify the available formal and non-formal education and training possibilities, certification programs and official documents, the main challenges that are encountered, and the main educational needs as well as the main conclusions and recommendations.

This State of the Art report is a result of the compilation of the regional reports produced by four partner countries: Austria, Croatia, Ireland and Spain.

The report will serve as a basis for the next project activities, particularly O2 - Game Content.

In the preparation of the report, different research techniques have been used in order to analyse the context of the Environmental and Sustainable Education and the needs that could be addressed by the game to be developed in the framework of the ERASMUS+ project “Promoting Green Skills Through Games”.

A profound desk research was conducted during the months of February to April 2018 using internet based search that has brought up different reports, policies, strategies and official documents.

A qualitative research has also been carried out conducting 18 interviews with relevant actors in the environmental education in Austria, Croatia, Ireland and Spain.

- Austria has interviewed a Head of a school, 2 teachers and a game designer
- Croatia has interviewed the principal and the teachers of a primary school and a secondary school, as well as an NGO and an environmental expert
- Ireland has interviewed 2 teachers, an association of teachers and the National Council for Curriculum Development.

- Spain has interviewed 2 teachers, the manager of an education programme, a public network for teacher support, and the environmental education coordinator of the Department of Environment of the Basque Government.

## 2. ENVIRONMENTAL EDUCATION

In Austria, Croatia, Ireland and Spain, **education has gained higher prominence** as a vital cross-cutting factor in the promotion of sustainable development. While countries vary on to what extent they have implemented sustainability education, **all have taken large strides** toward improving their education systems in this regard.

All of the participating countries are **providing an environmental education** to their children in primary and secondary schools. The education systems vary, but they all follow the European and **national strategies**, as well as taking into account the 17 UN Sustainable Development Goals.



Indeed, all 4 countries have a national strategy in place regarding **Sustainable Development** that includes the importance of education. Ireland and the Basque Country even count with a specific **Education for Sustainability Strategy**.

Sustainability is in fact a topic that will be exceptionally important to subsequent generations of

students, as they tackle the issues of climate change, environmental degradation, and more.

Whilst the first experiences of environmental education in schools took place fundamentally through **outdoor activities**, today, environmental education is included somehow in all of the **curriculum**s and it is taught as well in the classroom.

Environmental education is not only needed to show students how they are connected with the environment and how they can positively impact it, but also to help them develop the skills that will be necessary for them to achieve and maintain sustainability in the future.

A plethora of **high quality resources** are available to teachers and students in the realm of education for sustainable development in most of the given countries.



**Programmes, organisations, councils, networks, projects, associations, consortiums, authorities, competitions...** a long list of actors is identified and they all have a role in education for sustainability.

Teachers are **under pressure** to make sure that the curriculum is covered during the short school day. Although **the interdisciplinary nature of environmental education** presents opportunities, this can also present difficulties in finding the avenues to include it in the school day.

The extent of **initiatives** aimed at primary and secondary schools **compete with one another for precious class time**. Therefore, it is important to make the environmental educational more **attractive** for the **school system, the students and the parents**.

## 2.1 FORMAL EDUCATION

While there are currently some environmental science and ecology classes in primary and secondary education today, few of them actually teach the topics of sustainability in sufficient detail to actually matter in students' lives:

COUNTRY	FORMAL EDUCATION
AUSTRIA	In Austria, the specific goals outlined for primary schools are grouped in the topic area "Nature and Environmental Protection", and "Development of responsible behavior when using technical devices". In secondary schools "ecology and environment" is one of the topics that can be chosen.
CROATIA	In Croatia, in primary and secondary schools there is no special subject concerning the environment; however this topic is dealt with within different subjects and in the complete activities of the school. The syllabus contents are in fact related to the environmental problems; however, the traditional division into scientific disciplines prevents interdisciplinary work and an integral understanding of environmental problems. Some secondary schools in Croatia have courses for ecology technicians.
IRELAND	In Ireland, in primary school, "Social, Environmental and Scientific Education" is one of the six curricular areas. Although sustainability can be incorporated into subjects on the primary and secondary cycle curriculums, very often, whether or not there is any focus on sustainability depends on the individual class teacher or sustainability 'champions' within the school.



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## 2.2 NON-FORMAL EDUCATION

In all 4 countries there are **valuable resources** in non-formal environmental education.

**Environmental centres** for indoor and outdoor activities for school children, **interpretation centres, competitions, green or eco labels** for schools... there are a number of non- formal education activities where school children participate.

Moreover, there are well established environmental education programmes such as **Green Schools**, "**Eco-label for Schools**" (USZ) and **School Agenda 21** that are proving to be successful and which complement the formal education in schools.








### 3. GOOD PRACTICES ON LEARNING APPROACHES AND METHODOLOGIES FOR TEACHING SUSTAINABILITY

The following good practices have been identified, distributed according to the following two main typologies:



#### Interactive contents and games

1. Sustainability Illustrated
2. Utah Climate Change
3. Irauntxoak
4. N3VR Diverterra
5. Explorer HQ
6. Sparx
7. Ugotchi
8. CS Unplugged



#### Educational programs

1. Green Schools Program
2. School Agenda 21
3. The Innovation School for Green Future
4. Volvo Ocean Race
5. Ekoetxea
6. Aztertu Programa
7. Kutxa Ekogunea
8. Ecoprofit

*Animation videos*  
*Cartoons, illustrations*  
*Blogs*  
*Multiplayer games*  
*Video games*  
*Puzzles*  
*Mobiles apps*  
*"Missions"*  
*Shelf-help online programs*

*Traditional training*  
*Outdoor activities*  
*Visits*  
*Experimental workshops*  
*Playful/recreational sessions*  
*Drawing, photography contests*  
*Students as teachers*  
*Eco-park, urban farming*  
*Certificates*

## 3.1 INTERACTIVE CONTENTS AND GAMES

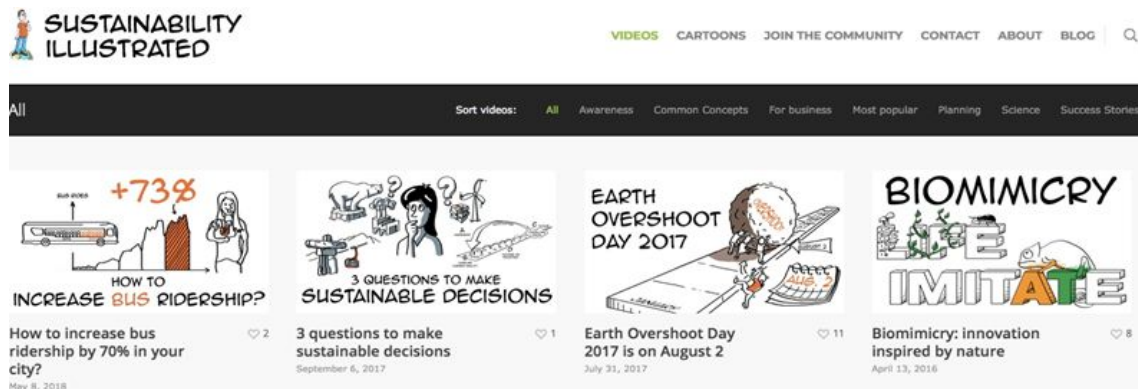
### 3.1.1 Sustainability Illustrated:

**Description:** A portal providing a collection of **animation videos, cartoons and illustrations** to help people learn about and teach sustainability in an engaging and effective way. It also has a blog.

#### Why is it innovative?

- For **free contents**, presented in a **comprehensible way**.
- In English and French, and some contents in some **other languages**.
- It encourages the **involvement of the community**.

**Promoters:** International non profit “The Natural Step”



The screenshot shows the Sustainability Illustrated website interface. At the top left is the logo with a person icon and the text "SUSTAINABILITY ILLUSTRATED". To the right are navigation links: "VIDEOS", "CARTOONS", "JOIN THE COMMUNITY", "CONTACT", "ABOUT", "BLOG", and a search icon. Below the navigation is a "Sort videos:" dropdown menu with options: "All", "Awareness", "Common Concepts", "For business", "Most popular", "Planning", "Science", and "Success Stories". The main content area displays four cards:

- HOW TO INCREASE BUS RIDERSHIP?**: Features a bar chart showing a +73% increase and a person holding a bag. Title: "How to increase bus ridership by 70% in your city?". Date: May 8, 2018. 2 likes.
- 3 QUESTIONS TO MAKE SUSTAINABLE DECISIONS**: Features a person thinking and various icons. Title: "3 questions to make sustainable decisions". Date: September 6, 2017. 1 like.
- EARTH OVERSHOOT DAY 2017**: Features a globe and a calendar. Title: "Earth Overshoot Day 2017 is on August 2". Date: July 31, 2017. 11 likes.
- BIOMIMICRY**: Features the text "BE IMITATE" with a person and a bird. Title: "Biomimicry: innovation inspired by nature". Date: April 13, 2016. 8 likes.

<https://sustainabilityillustrated.com/en/>

### 3.1.2 Utah Climate Challenge:

**Description:** An asynchronous, **round-based multiplayer game** to address the challenges of **group dynamics** in a **museum environment**. The shared screen is controlled by five terminals that players can step up to at any time to spend a limited number of rounds **battling climate change**.

#### Why is it innovative?

- Every **small decision adds** up to larger consequences and **players adopt roles**.
- Players **explore the impact** of poor decisions through extreme events (wildfire, droughts...) that wreak havoc on their designs.
- **Cooperative work**.

**Promoters:** National History Museum of Utah



<https://preloaded.com/work/utah-climate-challenge/>

### 3.1.3 Irauntoak:

**Description:** A **video game** that aims to bring children closer to sustainability. It is divided into four parts: saving **energy**, **waste** and responsible **consumption**, **water** and sustainable **mobility**. Primary and secondary school. Based on extraterrestrial characters.

#### Why is it innovative?

- **A video game**; fun.
- It consists of passing different **tests**.
- There are some antagonistic characters to the Irauntoak, who always do the opposite activity to what should be done; Irauntoak gradually teaches the antagonistic characters to more sustainable behaviours.

**Promoters:** Government of the Basque Country.



[http://www.euskadi.eus/gobierno-vasco/contenidos/nota\\_prensa/irauntoak/es\\_prensa/indice.html](http://www.euskadi.eus/gobierno-vasco/contenidos/nota_prensa/irauntoak/es_prensa/indice.html)

### 3.1.4 Diverterra – mobile app N3VR:

**Description:** A mobile app, as a virtual museum. Awareness raising of public education and contributing to lifelong education based on gathered knowledge, competencies and values needed for **life quality improvement**, regarding **environment and nature**.

#### Why is it innovative?

- It is a **3D virtual world of natural biodiversity** where a user can virtually move in all directions.
- Content can be directly on the smart phone screen or through carton glasses (this last case only for devices with a built-in gyroscope).

**Promoters:** A project funded by the EC



### 3.1.5 Explorer HQ:

**Description:** A game that teaches sustainability, aimed at **primary school**, covering **Geography** topic. It challenges the player to **undertake a “mission”**, take a photograph of the completed task, share the image, and collect badges as reward.

#### Why is it innovative?

- Competition, **contest approach**.
- **Outdoor activities**.
- Sharing results



[www.explorerhq.com](http://www.explorerhq.com)

### 3.1.6 Sparx:

**Description:** An award-winning **online self-help program** designed to help young people **learn skills to deal with feeling down, depression** or when feeling stressed (for the age group of 12-19).

#### Why is it innovative?

- Based on a **therapy, game based version** was developed, with **extensive clinical trials** on the method.

**Promoters:** Endorsed by the New Zealand Government



<https://www.sparx.org.nz/>

### 3.1.7 Ugotchi:

**Description:** An action program that focuses on keeping children **healthy** and is directed **against obesity; focused on creating an impact with gamified activities.**

#### Why is it innovative?

- **Specific training for teachers**, a selection of videos (**self-training**).
- Visible people (e.g. athletes) to be “**sponsors**” and champion of the programme.
- A combination of **individual contributions** to support **collective achievements.**



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**Promoters:** Several companies and Austrian Government.



<http://www.ugotchi.at/ugotchi/programm/>





### 3.1.8 CS Unplugged:

**Description:** A collection of **free learning activities** that teach Computer Science through engaging **games and puzzles** that use cards, string, crayons and lots of running around. Used in many contexts, outside the classroom too.

#### Why is it innovative?

- no computers required; **no specialised equipment**
- **learning by doing**; fun; variations encouraged
- for everyone; **co-operative**
- stand-alone activities; **resilient**

**Promoters:** University of Canterbury, Google, Microsoft


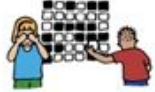





<https://csunplugged.org/en/about/>

Home / Topics

## Topics

Open a topic to see all related unit plans, lessons, curriculum integrations, and programming challenges.

<h3>Binary numbers</h3> <p>Ages 5 to 10 6 lessons 7 curriculum integrations 24 programming challenges</p> 	<h3>Error detection and correction</h3> <p>Ages 5 to 10 3 lessons 5 curriculum integrations 24 programming challenges</p> 
<h3>Kidbots</h3> <p>Ages 5 to 10 4 lessons 4 curriculum integrations 50 programming challenges</p> 	<h3>Searching algorithms</h3> <p>Ages 5 to 10 6 lessons 4 curriculum integrations</p> 
<h3>Sorting networks</h3> <p>Ages 5 to 14 4 lessons 2 curriculum integrations</p> 	



## 3.2 EDUCATIONAL PROGRAMMES

### 3.2.1 Green Schools:

**Description:** Green-Schools is Ireland's leading **environmental management and award programme**, working with primary and secondary schools across the country.

#### Why is it innovative?

- **8 themes:** waste, energy, water, travel.....
- A wide **variety of resources** are available.
- Clear links to the **curriculum**.

**Promoters:** Environmental Education Unit of An Taisce (FEE member for Ireland). Operated in partnership with Local Authorities and different department of the Irish Government.



<https://greenschoolsireland.org/>

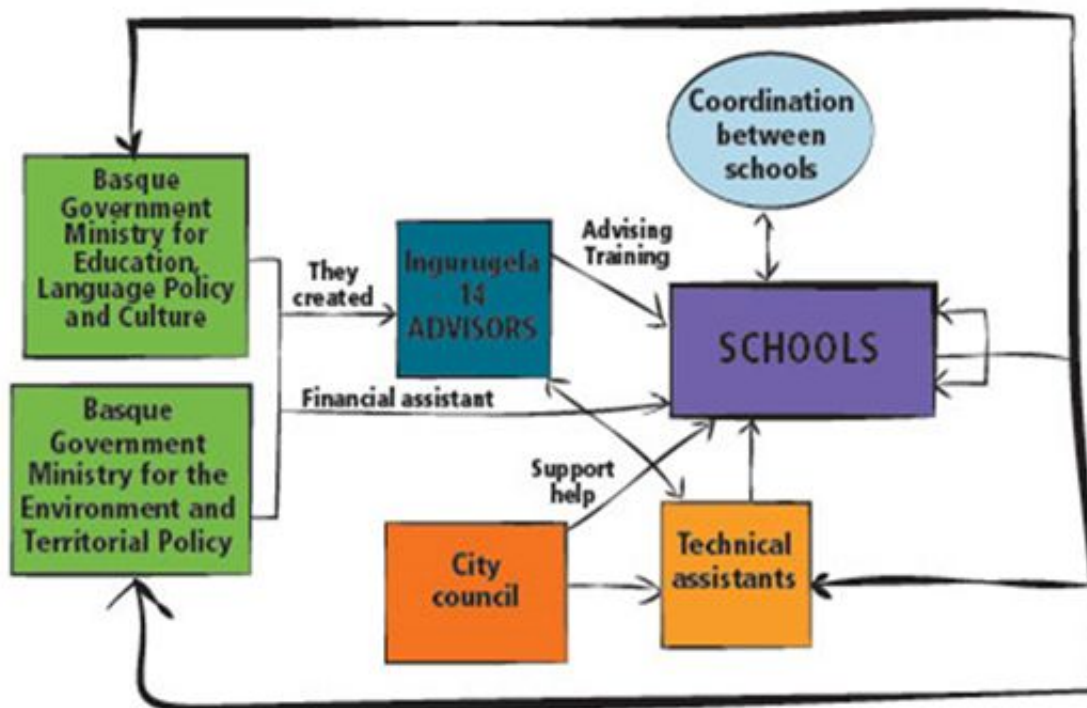
### 3.2.2 School Agenda 21:

**Description:** A very **powerful programme** working since 2003. **70% of the schools** of primary and secondary schools of the Basque Country have been involved in this voluntary project for sustainable development. In each centre there is a **dedicated teacher** to develop the programme. There is an evaluation process to give the credit to the High Quality School Agenda 21 experiences

#### Why is it innovative?

- It considers school sustainable development in **management**, in the **curriculum** and in **participation**.
- **School networks** have been set up in local councils and districts that **work together**.
- The municipal authorities **listen to the children and young people** and respond to the proposals

**Promoters:** Government of the Basque Country.



<http://www.euskadi.eus/informacion/agenda-21-escolar-educar-para-la-sostenibilidad/web01-a2inghez/es/>



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### 3.2.3 Innovative school for green future:

**Description:** Strengthening of the capacities of **vocational teachers** needed to introduce modern approaches to student-oriented teaching and the development of students' competences in the field of modern **technological knowledge**, with a focus on **nature** protection and the **environment**.

#### Why is it innovative?

- A **mobile application for students and teachers**.
- 50 **enterprises** participate in project activities.
- 2 secondary schools equipped with **modern equipment**.

**Promoters:** Project funded by the EC.



<http://www.inovativnaskola.eu/index.php>

### 3.2.4 Volvo Ocean Race:

**Description:** Own Sustainability Education Programme for students aged 6-12 years old. Linked to the **United Nations** Clean Seas Campaign and the UN's Sustainable Development Goal 14 (Life Below Water).

#### Why is it innovative?

- Available in many **languages**.
- Focused on **water**.
- Very **comprehensive program**.

**Promoters:** Volvo Ocean Race.



<https://www.volvoceanrace.com/en/sustainability/education.html>



### 3.2.5 Ekoetxea:

**Description:** A **network of facilities** dedicated to the **environmental interpretation and awareness** of citizens in the care and conservation of the environment and the biodiversity. There are **4 interpretation centres**. Visits: 100 thousand people and 25 thousand schoolchildren every year.

#### Why is it innovative?

- Based on **activities to learn through observation, analysis and fun**.
- Visits to the **particular ecosystem**, along **videos** and **other** training materials.

**Promoters:** Government of the Basque Country.



### 3.2.6 Aztertu:

**Description:** An environmental education programme to **draw attention to the need to preserve the environment**. Two annual campaigns which include **observation visit centres** in nature: AZTERKOSTA (in the coast) and IBAIALDE (in rivers). It consists of **two days of training** (**teachers, schools** and the **general public**, families, associations), with several activities: **visit**, a **report**, a drawing and photography **contest** and an **Awards Event**.

#### Why is it innovative?

- Adaptation of the European environmental education programme "**COASTWATCH**".
- **Participative approach**.
- Combination of different activities.

**Promoters:** Government of the Basque Country.



<http://www.euskadi.eus/aztertu/>



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### 3.2.7 Kutxa Ekogunea:

**Description:** An **eco-park** that aims at raising awareness about sustainable behaviour models. Different activities: a children park, didactic sessions, urban farms, linguistic ecology activities, a “forest-school”.

#### Why is it innovative?

- **Practical and experimental workshops.**
- **Visits.**



<http://www.ekogunea.eus/es/>

### 3.2.8 Ecoprofit:

**Description:** An **international label** for technical environmental protection and is **awarded to companies and individuals**. Students can obtain the qualifications ECOPROFIT ASSISTANT and ECOPROFIT REPRESENTATIVE. Six different topics.

#### Why is it innovative?

- Students can **learn from other students** (“they learn better from people their age”).
- When they achieve the certificate **they teach** in classes of the same school but also in different schools on different topic.



<https://www.it4education.at/ecoprofit/ecoprofit-allgemein.html>



## 4. MAIN CHALLENGES AND EDUCATIONAL NEEDS

### 4.1 IDENTIFIED NEEDS

#### 4.1.1 Contents:

Going beyond environmental education to reach education for sustainable development, that includes **social and economic dimensions**. (Basque Country)

Going into depth on the subjects of **food and water**, since energy and climate action are covered by other initiatives, as ECO-UNESCO. (Ireland)

#### 4.1.2 Educational model:

Greater **involvement** of sustainable education on **secondary schools**. (Basque Country)

Innovative **teaching methodologies** based on emotional intelligence and personalised education aimed at developing individual capabilities (Basque Country)

Development of pedagogic methodologies aimed at **problem solving**. **Inductive learning** methodologies (teach by questioning and through challenges) and teaching programmes that bring learning into the real world (Basque Country and Austria)

Promote the **role of the teachers** supporting learning within a scheme of collaborative teaching (Basque Country and Austria)

#### 4.1.3 Didactic resources

Digital resources to **promote group interactions** and reflections for an active participation from students (Basque Country)

Introduce the **new model of teaching based on informative and communicational technologies** on education for sustainable development: informatics-communicational skills as methodologies of work in gathering information and developing new processes of learning (Croatia).



## 4.2. BARRIERS

### **4.2.1 Lack of resources and means and shortcomings of the educational system:**

The **lack of time**, the non-compulsory nature in some countries of this subject causes environmental training and education is only subordinate in relation to other subjects. (Basque Country, Ireland)

Specific investment in the infrastructure are needed on schools and **access to computer room** and equipment (wireless network, computers,..) (Austria)

Lack of **digital skills on teachers** for a greater use of digital didactic resources (Austria)

There **is not a clear strategy**, with priorities and with follow-up objectives and indicators as well as a continuous assessment of what works and what doesn't on environmental training. (Basque Country)

The recycling of environmental educators is also necessary. **Need to adapt methods of teaching to the current trends** in the methods of knowledge transfer (Croatia, Basque Country)

### **4.2.2 Absence of real involvement of key agents:**

Society: Lack of contact between **theory and practice** and lack of real environmental awareness and lack of collective and individual initiatives in environmental education (Austria, Basque Country)

**Parents:** Families are not demanding sustainability related teaching (Basque Country, Ireland)

Schools: Despite the wide participation of training centers on specific programs (green schools), there is **no real implication on a green management of the activities of centers**, as purchase, waste management, energy efficiency,.. (Ireland, Basque Country)





### 4.3. SKILLS GAPS

- **Responsibility (for recycling of waste...)**
- **Critical thinking:** It needs trust and a little bit of risk
- **Holistic approach and multidisciplinary thinking:** not just bio things (tips to save water...), but also social aspects (i.e. cohabitation...) or other concepts (i.e. ecological footprint).
- **Practical use of theoretical knowledge:** greater connection with nature
- **Empathy**
- **Cooperation**
- **Organisational skills**
- **Respect of rights for future generations:** lack of long term vision
- **Respect of diversity**

### 4.4 TEACHING CHALLENGES

#### *4.4.1 New strategy for sustainable education:*

The need for an "**Integral sustainable education**", changing environmental education to a higher valency, with **social** dimension, focused on **people and values**, prioritizing the pluridisciplinarity with other subjects, innovation in education and lifelong education. (Austria, Basque Country)

**Lack of time** to focus on sustainability educational contents, as **contents required by official curricula are prioritized**. Some changes in the curriculum would be necessary – make sustainability more important. (Basque Country, Croatia, Austria, Ireland).

Need of **coordination between initiatives**, programs and institutions. In addition to the lack of time, there are a lot of initiatives on environmental education that compete with one another for precious class time ( Ireland, Basque Country)

#### *4.4.2 Additional means and resources:*

**Lack of training materials** or inappropriate didactic methodologies (Croatia and Austria)

The **training of educators** is also necessary on environmental concepts and the use of new technologies applied to education (Croatia, Basque Country, Austria)

Adaptation of didactic methodologies, infrastructures and equipment to a **digital world** (Ireland, Croatia)



## 4.5 STAKEHOLDERS' INVOLVEMENT

### 4.5.1 School community:

**Teachers** are the key agents, as environmental teaching mainly depends on their own attitude and motivation. (Basque Country)

School community, including **parents** and tertiary staff: group discussions around sustainability (Austria, Ireland)

### 4.5.2 Public Authorities:

Policy regulation - **New regulation** including environmental education as part of the school curricula would promote a more appropriate education offer. (Croatia, Basque Country)

Public **funding** is an important factor to promote sustainability teaching and the implementation of more innovative methodologies. (Croatia, Basque Country, Austria)

### 4.5.3 Local communities:

Bring the community to the classroom: key **socioeconomic** agents, **third sector entities, family members**,... Teaching in sustainability must be integrated in the life of the environment. (Croatia, Austria, Ireland, Basque Country)



## 5. RECOMMENDATIONS FOR THE GAME

### 5.1 DIDACTIC METHODOLOGY

**Alignment with the curriculum**, specifying the competences that will be developed throughout the game and working by didactic units. In order to appeal to teachers, it is necessary to make the linkages to the curriculum obvious so that lesson plans can be drawn up accordingly. Teachers will want to be able to assess the learning or changes in thinking.

**Problem based learning approach.** The teacher no longer teaches, she or he is the advisor, the guide for the children to think for themselves (i.e. Warning of contamination in a water treatment plant at the municipal level, who is responsible, what can we do, research ... and the students should investigate the problem and propose solutions).

**Interdisciplinary game.** The game would be best accepted if it involves more courses (subjects) than one and supports interdisciplinary learning. It should be possible to make a whole project for the entire school out of it.

**Group playing** to promote a participatory group work in class; i.e. define objectives per group and create a competition among different schools and even, among different countries. It is how they are used to work nowadays; we escape from the more individualistic methods.

**Strategic game** based on a strategic approach (i.e. how to manage the energy of a building...).

### 5.2 CHARACTERISTICS OF THE GAME

**Fun** to play and educational.

Triple dimension: environmental, but including both **social and economic** dimensions.

A game to empower young people to **develop 'critical skills'** including problem solving, empathy, a sense of place and the development of cooperative skills.

A game to raise the awareness that **each individual action matters**, and that even the smallest contribution helps to achieve the overarching goal.

A game to trigger the **motivation** of the students and their surrounding to go out and explore.



A game that explores **real life** consequences - have real life challenges.

Very **easy** materials – students should work on the materials by their own and learn from each other.

**Self explanatory** materials so as to not waste time on the explanation and the installation.

A game integrated in the **school system**.

Special attention should be placed in the type of characters and animations so as to contemplate **gender and race diversity**.

**Cooperation and competition** elements in the game.

### 5.3 IDEAS FOR THE GAME

A game where a part can be covered in **other subjects** such as chemistry, biology or English.

We could include the **families and society** somehow in the game.

To create a **diagnostic tool** to check the students knowledge about environmental problems and check if they know how they can help to solve them.

The game could offer an **analog** layer of teaching materials and real life activities.

To offer well structured materials for variety of platforms and combination of **in-class and outdoors activities**, along with good support and upskilling for teachers.

Integrating the **modern** way of gaming **and** the **traditional** (e.g. board game).

The game could offer the kids different characters to pick from and then give a **role to the teacher** (not a figure of authority, but rather support, help, advice).

The different **roles of the different stakeholders** could also be demonstrated, i.e. the city, the mayor, the citizens, the enterprises, the hospitals, the police department, the stores, the parents, the children...

The possibility to **earn points** or be rewarded for a “plastic free day” or similar.

To connect the students after class as a **homework**.

### 5.4 DURATION

Equipped with accompanying materials for a **three days project** on this topic.

Prepare a one session version (45 min) for short activities when they have a teacher replacement in class and a three days or even 2 weeks version to use it in different project situations.

Games/ topics in **5-7 sessions** with a maximum duration of **45 minutes** with linked contents, where the teaching staff can choose.

## 5.5 TECHNOLOGY

PC vs MOBILE	
<ul style="list-style-type: none"> <li>- Formal education prefers PCs.</li> <li>- All the centres have a projector in the classrooms and the children have computers but not all have tablets.</li> <li>- If the game is to be used in class, then the game should be for PCs as these are the available devices.</li> </ul>	<ul style="list-style-type: none"> <li>- Non-formal and secondary education prefers tablets</li> <li>- The game should be available for tablets and phones, both android and iOS.</li> <li>- Usable on personal smartphones. (No in class tablets available).</li> <li>- Most children above 12 years old have a mobile device to play from home.</li> </ul>

If possible we should include **virtual reality** (i.e. Pokemon). Children under 8 are amazed with basic virtual holograms.

Link to **social media** as competitions draw significant media and social media attention, and many schools keep active Twitter and Facebook accounts in addition to a website.

## 5.6 AGE CONSIDERATIONS

Game sensitive to **target groups**.

**Two levels** of game: for primary schools pupils (between age 10-15) and secondary schools pupils (15-18).

We should narrow down our target, it's **very different** to teach children under 8, children from 8- 12 and older than 12. The game is therefore different too.





Students in the first class **cannot read**, we work with pictures and questions to talk about in the first class.

The **older** they become, they lose interest in sustainability and acquire a more consumer behaviour.



## 5.7 CONTENT

The game should be based on content that is reflected in the **curriculum**, which is what is taught in the centre, especially in the areas of social and natural sciences.

It is recommended that the game would refer to/include the **Sustainable Development Goals**.

The game should address a broader topic such as **climate change** or a problematic that goes beyond the basic tips for saving water, energy and waste.

Innovation: To think out of the box, not energy, water and waste tips but other themes such as **consumerism, mobility, urban areas...** The fight against climate change is the priority. We need to facilitate the change in behavior and let the experience emotions.

Children find the topic of climate change scary and that it's necessary to approach it in a **positive, constructive way**.

A game which encourages users to develop an appreciation for **nature** in addition to building knowledge is recommended.

The teaching about sustainability could start in the **school building** itself. There are many problems in the way the building is designed.

Possibility to have some specific themes in application like **protection of forest**.



## 6. CONCLUSIONS



*Today's youth will be the ones that have to make the decisions about sustainability tomorrow.*



*A game that will teach sustainability in primary and secondary schools will be very welcome by the whole community.*



*Teachers have the power to teach students the principles and skills necessary to preserve the planet for themselves and future generations.*



*Sustainability education is interdisciplinary.*



*An effective sustainability program not only teaches students the principles of sustainability, but also encourages them through actions.*



*While there are currently successful sustainability educational programs and best practices, they are not widespread.*





***Sustainability can be incorporated into the classroom without sacrificing the .time needed to teach core subjects***