

WORKING WITH EUROPE  
SCIENCE RELATED  
ERASMUS+ INITIATIVES  
2016 ⇒



---

On the move to detect what works for  
21<sup>st</sup> century young people in science learning and  
education

<b>iYOUTH - EMPOWERING EUROPE'S YOUNG INNOVATORS</b> (Completed)	<b>3</b>
<b>SCIENCEGIRLS - TEENAGE GIRLS AS CO-CREATORS OF SCIENCE LEARNING ENGAGEMENT</b> (Completed)	<b>6</b>
<b>OPEN SCIENCE SCHOOLING - FOSTERING RE-ENGAGEMENT IN SCIENCE LEARNING THROUGH OPEN SCIENCE SCHOOLING</b> (Completed)	<b>9</b>
<b>iCAP - EARLY INNOVATION CAPACITY</b> (Completed)	<b>12</b>
<b>YOUNG STUDENTS AS CRITICAL SCIENCE DETECTIVES</b> (From 2019)	<b>14</b>
<b>ECO-SYSTEMS OF OPEN SCIENCE SCHOOLING</b> (From 2019)	<b>18</b>
<b>FAMILY-BASED OPEN SCIENCE SCHOOLING</b> (From 2019)	<b>21</b>
<b>OPEN SCIENCE SCHOOLING TEACHER TRAINING</b> (Application March 2020)	⇒
<b>CLIMATE CHANGE LITERACY IN SECONDARY SCHOOL</b> (Application March 2020)	⇒
<b>CLIMATE CHANGE BASED EDUCATION - A NEW WAY TO SCIENCE</b> (Application March 2020)	⇒
<b>GLOBAL WORLD EDUCATION</b> (Application March 2020)	⇒
<b>SENIORS AS LOCAL CLIMATE DETECTIVES - A NEW WAY TO SCIENCE IN SOCIETY</b> (Application March 2020)	⇒
<b>SCIENCE 4 GIRLS</b> (Application March 2020)	⇒



## iYouth - empowering Europe's young innovators

The Commission calls upon European initiatives to carry out considerable experimentation in the field of fostering innovation interest, engagement and capacity among students in early schooling - and to encourage schools to create such learning experience that helps build up new generations of young European innovators.

The Commission's invitation should be seen against the background of changing Europe and a Europe transforming from traditional industry to innovation economy in the widest sense of this term.

To play a competitive role in the globalized economy, Europe is increasingly depending on a population of innovators and entrepreneurs, in particular dependent on new generations of young people with innovation interest, skills and capacity.

The Commission calls for such experimentation across all educational sectors, and with a special focus on early education and supported by relevant European funding mechanisms, including in particular Erasmus+ and Horizon.

This is in the iYouth context called the *Empowering European's Young Innovators Agenda*.

The iYouth project forms part of this Agenda through its contributions to the exploration of how to, in practice, foster innovation interest, engagement and capacity in secondary school.

The project will create and openly share guidelines, documentation and knowledge produced through the project's intensive experimentation, and with a special focus on the substantial co-driving and co-creation from the involved student teams from five different European countries, supplemented by the virtual participation of a student team from a Chinese secondary school.

The project will produce its results through taking the student teams (mixed aged teams of between from 12 to 15 years old secondary students) through four progressive 6 months phases of innovation engagement, progressing from an opening trying out phase to more complex innovation engagement phases:

- Go Innovate! 1 - LOCAL (Community driven)
- Go Innovate! 2 - SHARING (Youther-driven)
- Go Innovate! 3 - COLLABORATIVE (Community-driven+)
- Go Innovate! MAX - CO-CREATIVE (Project-driven)

The innovation engagement will be addressing local societal challenges and include considerable open schooling collaboration with cross-sector community resources.

Each of the Go Innovate! phases will build on the project's innovation engagement methodology platform, taking the student teams through the full circle of innovation engagement from simple curiosity to co-creation capacity. The project's Innovation Engagement Circle consists of five progressive steps:

- Innovation Curiosity
- Innovation Interest
- Innovation Engagement
- Innovation Skills
- Innovation Capacity

[The project's methodology is detailed and illustrated in the Attachment Pack]

All project activities will work through real-life and real-time local societal challenges and in close collaboration with and creating small eco-systems of community resources (the open schooling approach), and all project processes will involve the student teams as co-drivers and co-creators of planning, activities and results.

The post-project sustainability of those local eco-systems is a major priority in the project.

The participating student teams from each secondary school will be supported by 2 dedicated teachers, and the accumulated experience and knowledge on how to foster innovation engagement in early schooling will be shared with the entire teaching community in the participating schools and across the local community.

The project is expected to deliver significant contributions to the *Empowering European's Young Innovators Agenda* through its authentic and intensive experimentation, the documentation of this experimentation and the creation of valuable and useful outcomes for secondary schools across Europe as well as for European policy and research communities dedicated to develop innovation engagement in early schooling.

The key outcomes of the project will be:

- The iYouth open virtual platform
- The iYouth practical guidance collection
- The iYouth 30 minutes video
- The iYouth policy paper
- The iYouth special: research recommendations for the Empowering European's Young Innovators Agenda

The project consortium includes 2 knowledge partners with considerable didactic and virtual capacities, 5 practice partners (secondary schools) from 5 different countries and a quality and exploitation partner with 15 years in European collaboration.


All practice partners are dedicated to engage fully in the project's experimentation, and the engagement across the curriculum is formally endorsed by the school managements and by the public authorities to which the school refers.

Among its activities the 5 days iYouth Encounter holds a special position. The mobility event will bring together the participating student teams from the five European countries. The iYouth Encounter is expected to be extremely dynamic and productive. It is placed at the beginning of the last phase in the project to allow strong preparation and to allow considerable contributions to the project's final outcomes.

The mobility event will be co-designed and co-driven by the student teams.

Based on the project results the project intends to use its exploitation potentials to contribute significantly to the *Empowering European's Young Innovators Agenda*.

The iYouth project will share results and collaborate with similar projects funded through Erasmus+ and Horizon and make an effort to create synergy between these initiatives.

 UNIVERSITATEA STEFAN CEL MARE DIN SUCEAVA  
(COORDINATOR)

 EGINA

 PLATON M.E.P.E.

 COLLEGIUM BALTICUM

 INSTITUTE VILAFANT

 GHEORGHE TITEICA

 ISTITUTO VASTO

 TANEXT SCHOOL

 WORKING WITH EUROPE



## ScienceGirls

### Teenage girls as co-creators of science learning engagement

Europe's future economy and social coherence is depending on young generations with interests, skills and capacity far beyond what is offered in the traditional educational system.

Europe needs young people deeply engaged in science, research and innovation - and based on positive and engaging experiences of what science, research and innovation is at a very early age and in early schooling.

Young people are increasingly disengaged from science learning in schools and this is causing great concern in the EU Commission and among other global players.

We call this the Commission's SCIENCE LEARNING INNOVATION AGENDA, described and documented across numerous Commission documents, research papers and guidelines.

"Our research points to the potential value of schools and science educators engaging in activities and approaches that enable teachers and students to deconstruct popular gender discourses and stereotypes."

"Balancing Acts": Elementary School Girls' Negotiations of Femininity, Achievement, and Science, 2012 (Archer et al)

The ScienceGirls project aims to contribute to the Science Learning Innovation Agenda through practical experimentation in secondary school, and guided by Commission recommendation and by guidelines from leading science learning research communities. The project aims impact on science learning in schools re-defining it's to appeal to the young generations.

Synthesizing leading research, it is clear that most girls do not feel comfortable with science education and the values and personal identities linked to science and science jobs. The problem is not a lack of intellectual capacity; the problem is at identity level.

The teenage years are precisely the most important time in life for creating identity and personality, including gender identity, and this is why resistance to science among most school girls might in fact lasts a lifetime: when resistance towards certain school interests is directly linked to the creation of one's identity and personality, the resistance is very difficult to overcome in later in life.

This is why ScienceGirls addresses teenage girls from 13 to 15 years old and their relations to science learning.

The project will engage the girls in 3 major challenges:

#### HOW WE FEEL SCIENCE

- create a more authentic understanding of science and gender in early schooling through engaging teenage girls as co-creators of this understanding, through telling the personal and collective and gender-sensitive stories about science education and about the image of science in society

#### SCIENCE IN REAL-LIFE

- engage the girls and their support teachers in real-life/time science and research experience in collaboration with the local community, including interacting with female role-models in science and research

#### VISIONS OF EARLY SCIENCE ENGAGEMENT

- invite the girls to co-create scenarios of new ways of science learning in school that will appear attractive and relevant to teenage girls and their emerging gender identities

Their teachers will learn about gender-sensitive science learning alongside the teams, and support the participation of the girls', but will not hold a privileged position in the project, as a united research community clearly states that "science teachers are a part of the problem", very often practicing forms of science teaching that disfavours girls and confirms many girls' "prejudices" against science and science jobs.

The project will focus on and work through 5 overall innovative thematic, based on comprehensive preparatory reviews of recent science learning research:

#### CO-CREATION

##### IDENTITY

##### REAL-LIFE EXPERIENCE - OPEN SCHOOLING

##### MIXED REALITY COLLABORATION

##### AUTHENTIC VISIONS FOR ATTRACTIVE GENDER-SENSITIVE SCIENCE ENGAGEMENT

The 5 overall innovative thematic are detailed across the application and in the Attachment Pack.

The project consortium is organized accordingly: 6 secondary schools as practice partners + 1 secondary school engaged through the Spanish knowledge partner, 2 academic institutions as knowledge partners and a quality assurance partner with 15 years of EU experience.

Leading gender-sensitive science researcher Professor Louise Archer from the King's College in London has signed an agreement to collaborate with the project.

A strong and most dynamic climax in the project will be the 5 days SCIENCEGIRLS SCIENCE VISION ENCOUNTER mobility, along which the participating girls will create visions for what science learning in school could be - with a strong focus on female identity.

Key outcomes:

#### THE SCIENCEGIRLS GUIDANCE TO GENDER-SENSITIVE SCIENCE LEARNING INNOVATION IN SECONDARY SCHOOL

#### THE SCIENCEGIRLS 30 MINUTES VIDEO

SCENARIOS OF INNOVATIVE SCIENCE LEARNING IN SECONDARY SCHOOL - produced by the girls- teams

Policy paper: INNOVATION IN SCIENCE LEARNING IN SCHOOLS IS IMMINENT - BUT WHO WILL DRIVE?

Knowledge paper: CO-CREATION AND THE SCIENCE LEARNING INNOVATION AGENDA



**FURNESS ACADEMY**  
(Coordinator)



**UNIVERSITATEA STEFAN CEL MARE DIN SUCEAVA**



**UNIVERSITAT POLITECNICA DE CATALUNYA**



**PLATON M.E.P.E.**



**ELAZIG MTAL**



**ISTITUTO COMPRENSIVO PANICALE TAVERNELLE**



**SOLSKI CENTER KRANJ**

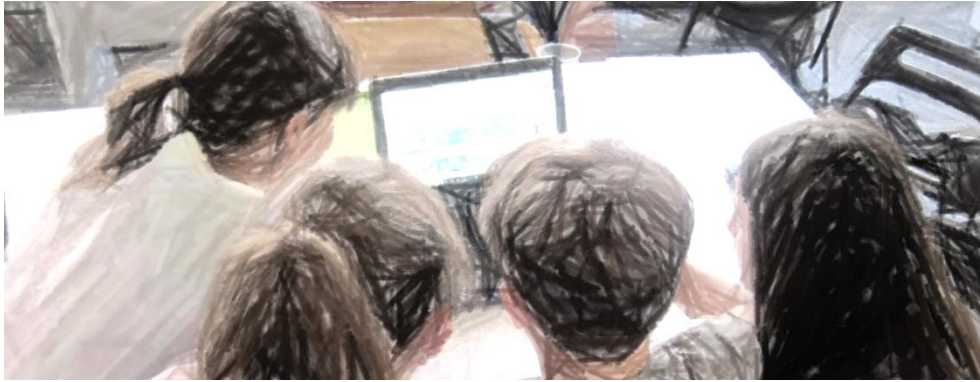


**PASVALIO LEVENS**



**WORKING WITH EUROPE**





# Open Science Schooling

## Fostering re-engagement in science learning through open science schooling



“Encourage “open schooling” where schools, in cooperation with other stakeholders, become an agent of community well-being; families are encouraged to become real partners in school life and activities; professionals from enterprise, civil and wider society are actively involved in bringing real-life projects into the classroom.”

COMMISSION 2015, SCIENCE EDUCATION FOR RESPONSIBLE CITIZENSHIP

Students in secondary school develop resistance towards science learning and science careers.

The Commission considers this one of the most important challenges to innovation and economic growth in EU.

State of the art research and key global stakeholders, such as the OECD and the EU Commission, jointly agree that the disengagement in science takes place in secondary school and typically when the students are from 12 to 15 years old, indicating that science resistance is strongly linked to the development of the students' identity and personality.

The Commission calls for the development of new science learning didactics, based on an Open Schooling approach, in which science learning processes are strongly linked to the students' participation in real-life science challenges in society and to participation in real research and innovation circles.

The project approach includes the following INNOVATIONS (basic Open Science Schooling didactics):

- engages students in REAL-LIFE science challenges in the society
- engages schools and students in practical science collaboration with resources in the COMMUNITY, including research, science, innovation and social resources and stakeholders
- offers students direct participation in epic, immersive and exciting MISSIONS
- invites CROSS-SUBJECT and cross-class approaches
- offers students with different LEARNING STYLES a variety of practice oriented work forms very different from traditional theoretical and laboratory-based science teaching, also benefitting less academic learners
- provides students with the opportunity and resources to develop a different IMAGE of what science is and what science could be for them, linking in much more narrative ways to the identity and personality of the young students

Open Science Schooling is almost exclusively a theory, a concept used in research and policy-making. This makes it very difficult for secondary schools and science teachers across EU to engage in practical experimentation.

EU needs to produce practical experience with Open Science Schooling and needs to offer secondary schools and science teachers across Europe PRACTICALLY USEFUL GUIDELINES on how to engage in Open Science Schooling. The Open Science Schooling project is one of the first systematic contributions in Europe to the development of such resources.

The mission of the project is to develop and produce Open Science Schooling guidelines through practical experimentation and through the co-creation of secondary school students.

The project will do this through implementing the Open Science Schooling agenda, consisting in 5 didactic challenges.

## 1. UNDERSTANDING

What is Open Science Schooling?

## 2. INTEGRATION

How can Open Science Schooling be integrated in secondary schools?

## 3. PRACTICE

How can Open Science Schooling be practiced in real-life and in collaboration with the community?

## 4. EVALUATION

How can the students' engagement and achievements be evaluated and documented?

## 5. ECO-SYSTEMS

How can the students' Open Science Schooling engagement lead to the creation of local open science schooling eco-systems?

The key outcomes of the project will be:

**A GUIDE TO OPEN SCIENCE SCHOOLING IN SECONDARY SCHOOLS**  
Practically useful guidance taking schools and teachers through the different steps in OSS, offering practical examples and giving useful advice - presented attractively in open virtual formats and in a variety of media forms

### OPEN SCIENCE SCHOOLING - THE MOVIE

The narrative and visual presentation of the student teams' 12 months real-life science engagement and how this experience affected them - co-created by the young teams

### YOUNG CO-CREATORS

The young students' personal documentation of their involvement in the project, in the local open science schooling activities and in the co-creation of results

### INTEGRATING OSS IN SECONDARY SCHOOLS - POLICY RECOMMENDATIONS

Recommendations for policy-makers on how to support the full integration of open science schooling, including recommendations for further research, experimentation and practical testing

The project will work closely with science teacher and student teams from the participating schools and the final results will be based on the authentic involvement of these players.

Students need epic and immersive real-life and authentic science experience to re-engage in science.

This calls for long periods of science engagement and this is why the project requests a duration of 30 months

The project is endowed with the participation of the nationally rewarded Ironi Bet school from Modi'in in Israel.

Having practiced open science schooling at the level of excellence for years, it will be a great inspiration along the Open Science Schooling project.



**UNIVERSITY OF EAST FINLAND**  
(Coordinator)



**UNIVERSITATEA STEFAN CEL MARE DIN SUCEAVA**



**UNIVERSITAT POLITECNICA DE CATALUNYA**



**ESCOLA BÁSICA E SECUNDÁRIA GONÇALVES ZARCO**



**PLATON M.E.P.E.**



**GIMNAZJUM NR 2 IM. KS. STANISLAWA KONARSKIEGO**



**PASVALIO LEVENS PAGRINDINE MOKYKLA**



**MODIIN MUNICIPALITY**



**WORKING WITH EUROPE**



## iCAP- Early Innovation Capacity



The Commission calls upon EU initiatives to carry out experimentation in the field of fostering innovation interest, engagement and capacity among students in early schooling and to encourage schools to create such learning experience that helps build up new generations of young EU innovators.

iCAP is one of the first practice-oriented projects in the EU responding to the Commission's invitation to establish experimentation with the creation of innovation interest, skills and capacity in primary and secondary school, and it also contributes to a new generation of Erasmus responding to the increasing EU interest in entrepreneurship and innovation based schooling.

Despite its ambitious mission, it is based on the realistic assumption that schools do not change fast enough to meet changing learning needs.

Even if such changes at systemic level are not likely, it is indeed possible for schools to offer their students relevant and powerful innovation and entrepreneurial experiences, from which they can develop innovation skills and capacity.

**iCAP is missioned to design, deliver and share experimentation with learning activities and formats that create innovation interest and capacity among students, based on transnational virtual collaboration and on addressing societal challenges presented by local entrepreneurs, innovators and pioneers in the participating communities.**

It will provide open spaces integrated into the learning activities for student teams to engage in missions, from research to small local NGO initiatives, in which they can follow, contribute and co-create innovative solutions to societal problems. This represents a powerful open schooling approach establishing local partnerships with the community and offering real-life/time challenges to the students as encouraged by the Commission.

The innovation interest and capacity will be trained in the transnational and virtual spaces in which future collaborative innovation and co-creation will take place. This will happen through the collaboration between the schools.

The students' co-creation and co-driving will not only be practiced in connection with the content and activities, but also and innovatively in connection with the implementation.

The project will create and openly share guidelines, documentation and knowledge produced through the intensive experimentation, and with a special focus on the substantial co-driving and co-creation from the students.

The results will be produced taking the student teams (12 to 15 year old) through the phases of innovation engagement, from an opening trying out phase to more complex engagement:

- Phase 1 - LOCAL (Community driven)
- Phase 2 - SHARING (Youth-driven)
- Phase 3 - COLLABORATIVE (Community-driven+)
- Phase 4 - MAX CO-CREATIVE (Project-driven)

Each phase will build on the project's innovation mechanics, taking the students through the full circle of innovation engagement from simple curiosity to co-creation.

All activities will work through real-life local societal challenges and in close collaboration with small eco-systems of community resources. The activities and processes will be worked, shared and discussed involving the students as they will be the centre, the co-drivers and co-creators of planning, activities and results.

Key outcomes:

- iCAP resource centre
- iCAP learning: building innovation interest and capacity in secondary schools
- I am an innovator - what R U? - video
- Supporting EU young innovators - in practice! (Policy paper)
- Special outcome - iCAP research recommendations for the Empowering EU Young Innovators Agenda

Results will be available on [www.icap.net](http://www.icap.net)

The consortium includes 2 knowledge partners with expertise in innovative didactics, including entrepreneurial and innovation oriented learning, 5 practice partners (secondary schools) from different countries and a quality and exploitation partner.

Practice partners are dedicated to engage fully in the experimentation, formally endorsed by the school management and by letter of collaboration.

Among its activities, the mobility holds a special position, bringing together all the students.

It is expected to be very dynamic and productive, and will be co-designed and co-driven by the students.



**UNIVERSITY OF GLOUCESTERSHIRE LBG**  
(Coordinator)



**SCOALA GIMNAZIALA GHEORGHE TITEICA**



**INSTITUT DE VILAFANT**



SOLSKI CENTER KRANJ



PLATON M.E.P.E.



PANEPISTIMIO THESSALIAS



FURNESS ACADEMIES TRUST



WORKING WITH EUROPE



## YOUNG STUDENTS AS CRITICAL SCIENCE DETECTIVES

“Above all there is a need to involve citizens, young and old, as active agents at the heart of inquiry-oriented science learning - in identifying and framing the research problems and leading to the discovery of solutions and innovations which help situate science in every-day life. In this way, we involve a richer pool of talent in framing a more responsible and ethical approach to research and innovation.”

COMMISSION 2015, SCIENCE EDUCATION FOR RESPONSIBLE CITIZENSHIP

The idea to create the YOUNG STUDENTS AS CRITICAL SCIENCE DETECTIVES emerged from a number of Erasmus+ experimentations with open schooling and open science schooling.

The lessons learned from this rich experimentation revealed that it is difficult, sometimes impossible, for secondary schools in Europe to implement and experiment with the full concept and methodology of what we understand as “open science schooling”.

The challenge for many schools and science teachers are: when trying to implement the full open science schooling methodology, they experienced - not surprisingly - that the traditional school and science curricula made it almost impossible.

Faced with these conditions in the Erasmus+ projects, many schools working with open science schooling limited the experimentation to more punctual out-of-school activities such as visit to science centers - or including technology to “modernize” the science teaching.

However positive such activities might be to students with less interest in traditional science teaching, such punctual activity is very far from what is intended in the open science schooling methodology.

The open science schooling methodology is about student teams’ long and immersive and full engagement in science activities and processes in the community - and this is quite demanding.

Therefore a group of partners started creating the idea of open science schooling approaches that were more practically implementable for schools and science teachers in typical secondary schools.

In other words: open science schooling that could be INTEGRATED in the normal science education or ADDED to normal science education without the need to change the curricula fundamentally - and sufficiently flexible to be implemented in different ways according to the schools’ capacity and resources.

As a result of renewed studies of the most important Commission science education innovation guidelines and recent critical science learning research, we recognized that one of the major components in science learning innovation was: to be attractive to 21<sup>st</sup> century students, science and science learning should recover and rediscover the links to NARRATIVE and make efforts to communicate the learning in narrative forms.

These links to narrative forms includes for example: adventure, science fiction, exploration, detective work, curiosity - and the ability to take action in such narrative worlds: narrative and epic agency.

The result was the YOUNG STUDENTS AS CRITICAL SCIENCE DETECTIVES concept, at the same time able to integrate (due to the term “critical”) important Commission science learning policies, such as “science with and for society” and “responsible science”, but also to integrate sharing the science engagement with the students’ families and with other citizens.

The ultimate mission of the project is therefore to create a model of YOUNG STUDENTS AS CRITICAL SCIENCE DETECTIVES that is attractive to schools and science teachers from across Europe and appears realistic to engage in.

The model will be co-created by the young students themselves, as this is credo for all true educational innovation in the 21<sup>st</sup> century.

The project is coordinated by Danish ABSALON UNIVERSITY COLLEGE and the partnership includes 8 partners from 7 European countries. The partnership is extremely pan-European with participation from Finland to Spain and from Greece to Denmark.

The project will produce a long line of process outcomes and the following major products:

#### **THE CRITICAL SCIENCE DETECTIVES MODEL**

A guidance collection for secondary schools and their science teachers on how to easily integrate the critical science detectives method in the science curricula

#### **I AM A SCIENCE DETECTIVE - R U?**

The student teams’ joint video movie explain how they changed their negative attitudes towards science through the critical science missions

#### **CRITICAL SCIENCE DETECTIVES AND THE OPEN SCIENCE SCHOOLING AGENDA**

A theoretical paper discussing state of the art of Open Science Schooling from the point of view of lessons learned in the Critical Science Detectives project

#### **THE FUTURE OF SCIENCE LEARNING INNOVATION**

A policy paper trying to identify the key challenges to science learning innovation, based on positive and negative experience from the Critical Science Detectives project; the policy paper wishes to identify key research and experimentation needs in the near future to make Open Science Schooling a reality



**ABSALON UNIVERSITY COLLEGE**  
(Coordinator)



**UNIVERSITY OF EASTERN FINLAND**





UNIVERSITAT POLITECNICA DE CATALUNYA



STANISŁAWA KONARSKIEGO



PLATON M.E.P.E.



PASVALIO LEVENS PAGRINDINE MOKYKLA



FRATII BUZESTI



WORKING WITH EUROPE



# ECO-SYSTEMS OF OPEN SCIENCE SCHOOLING



“Encourage “open schooling” where schools, in cooperation with other stakeholders, become an AGENT OF COMMUNITY well-being; families are encouraged to become real partners in school life and activities; professionals from enterprise, civil and wider society are actively involved in bringing real-life projects into the classroom.”

*Commission 2015, Science Education for Responsible Citizenship*

To make open science schooling a reality, the Commission recommends schools to have not only access to, but permanent and sustainable access to real-life and real-time science resources (locally and globally) for students and teachers to tap into - and the project will demonstrate how such permanent science collaboration should take the form of “eco-systems of open science schooling”.

ECO-SYSTEMS OF OPEN SCIENCE SCHOOLING will make available the basic resources, infrastructures and collaboration student teams need to carry through and accomplish open schooling science missions.

The project is missioned to contribute considerably to re-engaging young students in science and technology learning and in the world of science and technology - one of the top strategic priorities and innovation needs in European education.

Open science schooling has proved to be a strong and very attractive alternative to the very traditional science teaching, and to offer the young students a much more open, interesting and exciting way into what science can be for them.

The critique from the Commission of what can be called “modernisation” of science learning in secondary school is that such attempts mostly amount to punctual community activities, the use of modern technology and including discussions of societal challenges such as climate change.

The Commission clearly states that such modernizations do not fundamentally change traditional science teaching and are therefore not able to counter the increasing disengagement from science among young students.

However, schools do not have the resources to create such open science opportunities for the students from scratch - they need permanent and sustainable access to science resources in the local and global communities.

The project names these resources and the permanent access ECO-SYSTEMS OF OPEN SCIENCE SCHOOLING, using the term “eco-systems” to describe the living and constantly changing nature of such science resources and the students’

engagement with these resources, as well as the mutually benefitting interaction between a number of societal players.

The project will produce practice based guidance and good practice to schools and science teachers on how to establish and maintain such eco-systems in different ways.

The project idea is partly based on the extremely valuable lessons learned from the 30 months Open Science Schooling Erasmus+ Schools project, coordinated by the University of Eastern Finland.

The lessons learned are unfolded along the application.

Key methodologies and work methods in the project are therefore:

- The schools must be involved as organisations, not as individual teachers
- The eco-systems should be built in interplay with the student missions to create authentic knowledge resources, based on practical experience
- Basic community science collaboration resources must be available to the students, as recommended by the European Commission, and this will happen through the project's long and student-led open science schooling practice
- The project defines "community" in the broadest sense of the word: local community, region, but also scientific community or virtual community
- Student missions must address different kinds of communities in different phases of the project to engage the students in different parts of the world of science
- The eco-systems of open science schooling must be driven by the schools in their new role as "agents of change" in the community (OECD)

The ultimate mission of ECO-SYSTEMS OF OPEN SCIENCE SCHOOLING is to provide attractive and practically useful guidance to science teachers and secondary schools from across Europe to assist them building up eco-systems of science collaboration in their communities and guide their young students in their real-life and real-time science missions.

It is a paramount principle in the project that the open science schooling guidance to schools and teachers must be based on authentic student-led science engagement, on strong collaboration with a variety of science resources and on highly qualified knowledge creation from the student teams' practice.

The project's results are therefore not based on theory or abstract assumptions, but on dynamic practical experience.

Key outcomes will be:

**ECO-SYSTEMS OF OPEN SCIENCE SCHOOLING - THE GUIDANCE PACK**

**HOW WE LEARNED SCIENCE THROUGH THE ECO-SYSTEMS - THE STUDENT VIDEO**

**POLICY PAPER: WHAT (MORE) DOES IT TAKE TO MAKE OPEN SCIENCE SCHOOLING A REALITY?**

**RESEARCH PAPER: WHAT (MORE) NEEDS RESEARCH AND EXPERIMENTATION TO MAKE OPEN SCIENCE SCHOOLING A REALITY?**



**UNIVERSITAT POLITÈCNICA DE CATALUNYA**  
(Coordinator)



**UNIVERSITY OF EASTERN FINLAND**



UNIVERSITY COLLEGE ABSALON (UCA)



PASVALYS LEVENS



GONÇALVES ZARCO



GHEORGHE TITEICA



ELAZIG



WORKING WITH EUROPE



# FAMILY-BASED OPEN SCIENCE SCHOOLING

In 2015, the international community signed the Agenda for Sustainable Development 2030 and set 17 bold goals to reach a better and equal society. The fourth goal was established to be Quality Education, aiming to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (UNESCO, 2017). In our current society, in which digitalization and technologies transverse almost (if not all) dimensions of our everyday life, Science, Technology, Engineering, Arts and Maths (STEAM) abilities and digital competences become key factors for students to reach a good life. This scenario calls for a change in the school education paradigm - students need to become agents of positive transformations as digital citizens able to critically analyse problems affecting society and bring solutions to them.

For this, there is a strong need to boost the interest in and retention of students in STEAM subjects. However, a recent trend shows young students in K12 developing resistance towards science learning and science careers. Moreover, global players such as the European Commission and the OECD as well as leading research communities agree that one of the biggest challenges to 21st century education is to engage and re-engage young student along their teenage years in science learning.

One powerful way to practice to (re)engage young students in science learning connected to society demands is to include families and community in open real-life activities, engaging students and their families in science in the local and virtual communities. Families, especially parents, guardians and caregivers, have a crucial role at influencing students' engagement towards science learning.

Therefore there is a substantial need to bring in innovative educational practices in partnership of the supporting community surrounding school. Hence, this project has 3 main objectives: 1) Encouraging families to become real partners in school life and activities through participatory design; 2) Co-creating 'science everywhere' activities alongside teachers, students and families to support responsible science education; 3) Supporting the deployment of immersive Joint Science Missions involving the community as a whole so that schools become agents of community well-being.

Our Family-based Open Science Schooling project is one of the first systematic European attempts to experiment with such challenges. The project's most important mission is to develop practically useful guidance to secondary schools and science teachers on how to organize and facilitate family-based open science schooling with good quality, based on rich practical experimentation along the

project and on co-creation with young students and their families. All project elements are directed towards producing such practically useful and attractive guidance to secondary schools and science teachers through participatory design with schools and families. The success of such initiatives is totally depending on the quality of the capacity building and empowerment of science teachers, schools and the surrounding school communities.

Underpinning this basic innovation, the project's work methods add considerable novelty to the initiatives, as the project organization, experimentation and results will involve students, teachers and families as co-creators, through well documented participatory design approach. The project innovation is therefore linked to the European re-thinking science education agenda, dedicated to find brand new ways to make science and science learning attractive to young students, precisely along the years in which they strongly build their identity, personality and professional intents.

The project consortium comprehends two highly qualified knowledge partners (of which one is the project coordinator), five dedicated practice partners (secondary schools) from different countries and one quality assurance partner, covering in total eight quite different European member states, ranging from Finland to Portugal and from Poland to Turkey.

From this project, it is expected that young students engage in real-life science in open collaborating community and family teams, creating dramatically new images of what applied science is and how it can be practiced among teenagers. At the same time this open schooling environment will provide a reliable context for building responsible science mindsets towards active citizenship. The project will yield 4 product outcomes expressed through four Intellectual Outputs (IOs), and process outcomes will result from the various project phases. The main outcomes will emerge from a participatory design process in which teachers, students, family members and researchers will co-design and co-create their final versions.



**UNIVERSITY OF EAST FINLAND**  
(Coordinator)



**U. LUSÓFONA**



**PASVALYS**



**PLATON**



**S. PODSTAWOWA**



**ANATOLIAN**



**ROMAIN R.**



**WORKING WITH EUROPE**