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Scie-Citizens

Collected educational practices on how to bridge the gap between science and society

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1 INTRO-DUCTION

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Introduction Citizen Science – a two way path

Martin Barthel

Scie-Citizens believes in the power of participation in education. The partnership was built upon realizing that the role of facts become again more and more relevant for every citizen. The partners are aware that in lifelong learning the "academic ivory tower" seems to be the ultimate bastion, resisting to be involved with other learning paths. However, the approach of Citizens Science is an innovative methodology, involving both top-down but as well from a grass-root level learners and citizens to be involved in research and science. We believe that instead of reinventing methods, it will be more productive to evaluate existing tools, identify smart practices, collect, review and share them. Thus, Scie-Citizens consists out of partner from different education sectors, covering the geographic scope of all of Europe.

The mission of Scie-Citizens is to advance citizen science through knowledge sharing, collaboration, capacity building, and advocacy. The project aims to encourage broad and meaningful participation in citizen science through promoting inclusive and collaborative partnerships and facilitating a community that shares practices, knowledge, and tools to bring recognition to the value and impact of citizen science.

The project seeks to create an assessment tool for identifying smart practices using citizen science approaches and collect those practices in a method handbook. The handbook will be a tool-box for trainers, teacher and other facilitators to create innovative and tested instructions all over Europe and across all educational sectors. During 7 project meetings we will work on 70 good practice examples, and 7 policy briefs, which will be published in a comprehensive project eBook. All methods will be documented, collected and published at the end of the project. In order to identify smart practices, the partnership will collect indicators and create an assessment tool. The tool and the method handbook will be open accessible and will be used by institutions from all education sectors in formal and non-formal learning. The project can be understood as a pre-assessment of the needs to create and test European curricula in citizenship building.

The project targets directly trainer and teacher in all educational sectors. We

expect the participants of the project to extend their knowledge on using citizens science methods in their curricula. We expect participants organizations to professionalize and innovate their curricula through new methods. We expect learners to become more motivated to perform lifelong learning and we expect stakeholders to become more aware on the need to include participatory methods in teaching and training.

As declared in the Digital Market Strategy, European citizens need innovative approaches to keep up-to-date in the ever changing work market. A key 21st competence is the so called Information Literacy, the ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand. This became even more relevant lately, in the time of skepticism towards science and the wake of misinformation and so called "Fake News". The European Commission is tackling the spread of false information through their code of conduct to combat illegal online hate speech. The problem is rather tackled through self-regulation of the social media outlets. However, a more securing way to fit counter information is to engage and enable citizens to fact check and getting involved in both addressing and researching publicly perceived problems and deficits. A conduct on citizen science will help to inform the public and empower the European Citizens to assess information received.

ScieCitizens – Making Science more accessible

Rimante Rusaite

The Scie-Citizens project kicked off in Berlin late autumn 2017. As the main idea of the project is to question the existing dynamics between science and citizens, partners engaged unconventional methods within the project life cycle as well. Starting with a World Café mixed with LEGO Serious Play for defining the common ground.

The emerging message from the sessions, first of all, was about science being accessible by the society.

Consortium committed to looking for open processes working as bridges, where both scientists and citizens are involved.

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Science is a multidisciplinary power making positive changes possible. It's moved by curiosity of understanding complex systems: human and the contexts where we're living (society, earth). It's based on structured methods and a specific common language, not always understandable and, often, intimidating to the people outside of the scientific bubble.

A smart, Scie-Citizens, practice combines different elements to create something new for a specific context with a specific need - it should have the following features: be Open Source, accessible, circular use, process based, building new relations and based on scientists-citizens collaboration.

During the 2 years of Scie-Citizens, the project partners were continuously wrestling with the ideas about citizen science and science communication. How can these two concepts work together? What about the co-creation of science communication or at least having that dialogue via co-creative activities?

Broadly defined, Citizen Science is "scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions.[1]"

By being experts in the field and knowledge creators, scientists risk to take on a top down approach in communicating the output of their work. The process of popularisation is a form of boundary work. Understood in this way, science communication may explicitly exist to connect scientists with the rest of society, but its very existence only acts to emphasise it: as if the scientific community only invited the public to play in order to reinforce its most powerful boundary (according to work by Massimiano Bucchi or Brian Wynne[2]).

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[1] (OED (2016a). "Citizen Science". Oxford English Dictionary, Available at: http://www.oed.com/view/Entry/33513?redirectedFrom=citizen+science#eid316619123 (Last accessed 31st July 2019).

2 Massimiano Bucchi (1998) Science and the Media (London & New York: Routledge).

^ Wynne, Brian (1992) 'Misunderstood misunderstanding: Social identities and public uptake of science', Public Understanding of Science, vol. 1 (3): 281–304. See also Irwin, Alan & Wynne, Brian (eds) (1996) Misunderstanding Science (Cambridge & New York: Cambridge University Press).

Some studies have found[3], 'that participants value accessibility of their collected data, communication of project findings, and acknowledgement in publications. Taking this into account can pay off, as sharing data and findings can enhance the motivation of participants to engage in the project, thereby sustaining their participation, imparting the feeling that they spent their time well, and increasing a project's learning impact'.

If we see citizen science as a valid input into research and science communication becomes more inclusive, we might get closer to the concept of co-creating the message that is both valid and understandable. What about taking co-creation as un underlying philosophy for science communication?

That's what the Scie-Citizens project was building upon and hopefully got one step closer to.

ScieCitizens – Definition and reflections on Citizen Science

Guglielmo Appoloni, Martin Barthel

Science shouldn't be a tool for power control, neither a tool related to closed bubbles. Science should and nowaday can be accessible to the society. We're looking for open processes working as bridges, where both scientists and citizens are involved.

These processes can have two different ways:

Traditional one: scientists need to test an assumption and ask citizens to collect/create datas.

Flipped one: a specific community (geographical, topic -related) need to solve an issue/improve a condition, and harvest/create datas to make own community stronger and effective.

3 de Vries, M., Land-Zandstra, A. and Smeets, I., 2019. Citizen Scientists' Preferences for Communication of Scientific Output: A Literature Review. Citizen Science: Theory and Practice, 4(1), p.2. DOI: http://doi.org/10.5334/cstp.136

What is science for us?

Science is a multidisciplinary power making positive changes possible.

It's moved by curiosity of understanding complex systems: human and the contexts where we're living (society, earth). It's based on structured methods and a specific common language, not always understandable or usable by people outside of the scientific bubble.

Keywords:

- Power
- Common language / Special language
- Complex needs = interdisciplinary approach
- Curiosity
- Lifelong learning process to understand better over society
- Innovative: science making progress possible
- Documenting the human condition
- Scientific balance between reasoning and bad
- A way of thinking
- Structured method
- Should be fun
- Make science easy to understand and use as a tool

What does smart practice mean for us?

A smart practice combine different elements to create something new for a specific context with a specific need.

A smart practice has to be adapted in different contexts. For this reason a smart practice needs to be easily intelligible (process blueprint), and comparable (measurability) to other practices in terms of efficiency: impact generated respect to resources required.

Keywords:

- Could be understood negative
- Have to have an impact
- Synergies
- Difference
- Easy implementable
- The idea worth to follow
- Smart = adaptable
- Good is not always smart
- Instead feasible
- Effective
- Transferibility: if it's smart we can use it in another context

- Can be implemented in different enviroments
- Practice Culture
- Smart = intelligible, Measurable
- Does not have to be like it wa intended
- Creative way to adress a topic producing new prespective
- Smart practice sound presuading
- It is the best way to solve a problem in a context
- Combining assets
- Creating something new to help
- Out of the box
- Use assets in effective way for a purpose

Scie-citizens smart practices should involve one or more of the following elements:

Enabling factors. Scie-citizen can happen when some/many of the following factors are involved:

- Volunteers +
- Authority action ++
- ICT skilled people
- Early buzz
- Trust system
- Small hubs
- Local support
- Victim driven
- Knowledge raising
- Local resources management
- Empowerment
- Easy access to the technology
- App +++

Needs. Scie-citizen actions are driven by the need of a community, in order to:

- give proofs of an emergency/abuse
- join a critical mass on a topic/issue: together we're stronger
- seek life quality for the people of the community
- improve own job
- raise funds

Features of the outputs. Main output of a scie-citizens action have common features

- Open Source
- Easy access to the information
- Circular use
- Process based
- New relation builder
- Scientists-citizens collaboration

Scie-citizens smart practices happen when:

Something new happens, changing a previous situation, creating a new need.

One or more stakeholder explore the new situation, filling the gaps between the different elements.

They create and test a solution based on the access to science tools.

Their solution create measurable first results.

Around the first results they gather:

a community and a common vision

The community collaborate to get the best

There is an hole in the wall .. (change of status)

... that enhance the exploration of the new situation (learning about new opportunity)

You have to start filling the gaps, there's something you don't know about the story

You have to make wishes

Certain suggestion about the best (where we want to go)

Then we start to cooperate

Suddenly there is a bridger in the wall

2

SELF-ASSESSMENT

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Self Assessment Survey for Scie-Citizens Smart Practice

This project is promoted by us, a consortium of 7 different partners from 6 European countries. Our aim is to map smart practices advancing citizen science through: knowledge sharing, collaboration, capacity building and advocacy.

This is an assessment tool we're testing in order to identify these smart practices and collect them in a method handbook. The handbook will be a tool-box for trainers, teachers and other facilitators to replicate innovative and tested projects all over Europe and across all educational sectors.

Are you running a project based on citizen science approaches? Do you want to have published the value generated from your project in the tool-kit we're working on? Are you aiming to scale-up the positive impact you're creating with this project? Fill the following survey.

Important notice

This assessment form and the point system we've designed is not meant for ranking or comparison, but rather for revealing potential for improvement or excellence. Organisations should use it for self assessment and possibility to have a critical view on the activities.

A. Quantitative assessment

This is a first checklist to assess the potentiality of your project as a Scie-Citizens smart practice. **Answer Yes or No depending by the questions.**

Your project should satisfy at least half of the indicators in order to be further qualitatively assessed in the second evaluation form. If you don't reach the half but you want your project to be further evaluated, write us at info@scie-citizens.org.

Project output (i.e. article, scientific paper, manual, presentation, etc..)	YES	NO
1. Has your project produced a sharable output?		
2. Are the results easy to access and open source?		
3. If you developed your project with partners or collaborators, are they mentioned in the output?		
4. Is your target audience mentioned in the output?		
5. Are all the sources and copyrighted material cited and used with clear permission?		
Learning transposition		
6. Has the project stimulated critical thinking between participants?		
7. Are the learning objectives SMART (Specific, Measurable, Attainable, Relevant, and Time-bound)?		
8. Is there any clear interaction between science and teaching?		
9. Is the project based on interdisciplinary knowledge?		
10. Is your project identifying clear roles for participants?		
11. Is your project inclusive by design? (i.e. it has been co-designed by different stakeholders, it has been developed by the collaboration between participants and stakeholder, etc…)		
Accessibility to the method		
12. Is your project based on an existing method/mix of different ones?		
13. Are the methods your project is based on applicable for other topics/in other fields?		
14. Is these methods open source?		
15. Is the explanation of the method clear and understandable by a non scientific audience?		
Impact generated related to the community		
16. Have you started your project from a local need?		
17. Have you identified the positive impact of your project?		

18. Has the project impacted the quality of life of the community?		
19. Has the project improved work/job flow of involved actors?		
20. Has the use of resources been optimized to the context and focused on local needs?		
21. Are the used resources reusable and sustainable?		
22. Are you using dedicated tools to measure the impact of your project?		
Dissemination		
23. Is your project stimulating engagement between science, teaching, and citizens?		
24. Can stakeholders easily provide feedback?		
TOTAL SCORE:	**/24**	

B. Qualitative Assessment

General information		
Name of the organization		
Score from quantitative assessment		
Part I. Information about the method		
Name of the main method you've used in your project		
1. When have you applied the method for the first time?		
2. How often have you iterated the method?	• More than 10 times • From 5 to 10 times • From 2 to 4 times • Only once	***Notes***

	• Periodically (please specify)	**Points**[4]
3. How long is the implementation process for each application of the method?		
4. Geographical coverage of the method: What's the context you can apply the method?	• Local • Regional • National • International	***Notes***
5. Is there any other organisation applying or adapting the method?	• Yes • No	
6. Can you describe shortly how other organisations might adapt or have already adapted the method?		
7. In which sectors is this method applicable?	• Public sector • Science sector • Private sector • Non-governmental sector	***Specify***
8. What are the goals you achieve with the method?		
9. How many scientists/researchers you need to perform the method? What is their role?		
10. How many non-scientists/researchers you need to perform the method? What is their role?		
11. How long has it take to have first results/ effects noticeable?		
Part II. Impact of the project		

[4] Only question number **2 from the I. part** can get points. Number of points - from **3 to 0** (where answer: More then 10 times becomes 3 points, from 5 to 10 times becomes 2 points, From 2 to 4 times becomes 1 point, Only once get no points).

1. Has the project been proposed by research or by citizens?	
2. Who are the beneficiaries of your project?	
3. How many people have learnt the method thought your project?	
4. How do/did you measure/assess the impact of your project?	

Part III. Core information			**Points**
1. Does your project link society and science? If yes, which are the specific activities that create a link between science and society?			**
2. How do you involve your participants in applying the method in their community/peer group?			**
3. How strong are participants motivated to get involved?	1. very 2. quite 3. just so 4. not really 5. not at all		***
4. To which age range do the participants belong?	✦ Under 12 years old ✦ 12-17 years old ✦ 18-24 years old ✦ 25-34 years old ✦ 35-44 years old ✦ 45-54 years old ✦ 55-64 years old ✦ 65-74 years old ✦ 75 years or older		****
5. How would you define the process of your project?	• Top–down • Bottom–up • Co–creation	***Please describe***	*****

6. In which way does the method have impact on the participants regarding following aspects:	a. Building dialogue between research and society		***** *
	b. Co-creation of new knowledge		
	c. Creating positive impact in society		
	d. Empower citizens to contribute by expressing their real needs and problem		
	e. Another		
7. How does the documentation of the results look like?			**
8. How innovative is your project?	1. Very 2. Quite 3. Just so 4. Not really 5. Not at all		***
9. What makes your project innovative?			**
10. How have you promoted/do you promote your project?			**
11. What are the strengths of your project?			**
12. What are the weaknesses of your project?			**
13. What are the opportunities you can see for your project?			**
14. What are the threats you can see for your project?			**
15. Tell us a success story/anecdote related to your project			**
	TOTAL SCORE:		

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EVALUATION GUIDELINES

POINTS SYSTEM

Award from **4 to 0 points, use the following parameters for the evaluation:

4 points (comparable grade "VERY")- the answer is comprehensive, long and qualitative, the content has a special meaning for the learning pathway.

3 points (comparable grade "QUITE") - the answer contents a lot information important for the learning pathway, but you cannot say it is comprehensive.

2 points (comparable grade "QUITE") - the answer is sufficient but without special meaning for the learning pathway.

1 point (comparable grade "NOTE REALLY") - the answer describe a few aspects which are connected with the learning pathway, but not enough to give more points.

0 point (comparable grade "NOT AT ALL") - the answer does not give any response to this question or show any aspect of learning pathways.

*** award: Very – 4 points, Quite – 3, Just so – 2, Not really – 1, Not at all – 0.

**** award from **5 to 0 points**,

5 point if all aged groups are present in the project,

4 if more than 7 groups are present,

3 if more than 5 groups are present,

2 if more than 3 groups are present,

1 if 2 groups is present,

none points if only 1 group is present.

***** award from **4 to 0 points**, max. 2 for answer a), max. 2 for answer b) .

****** award from **5 to 0 points**, each answer (a, b, c, d, e) can receive 1 point

3

DIALOGUE BETWEEN SCIENCE AND SOCIETY

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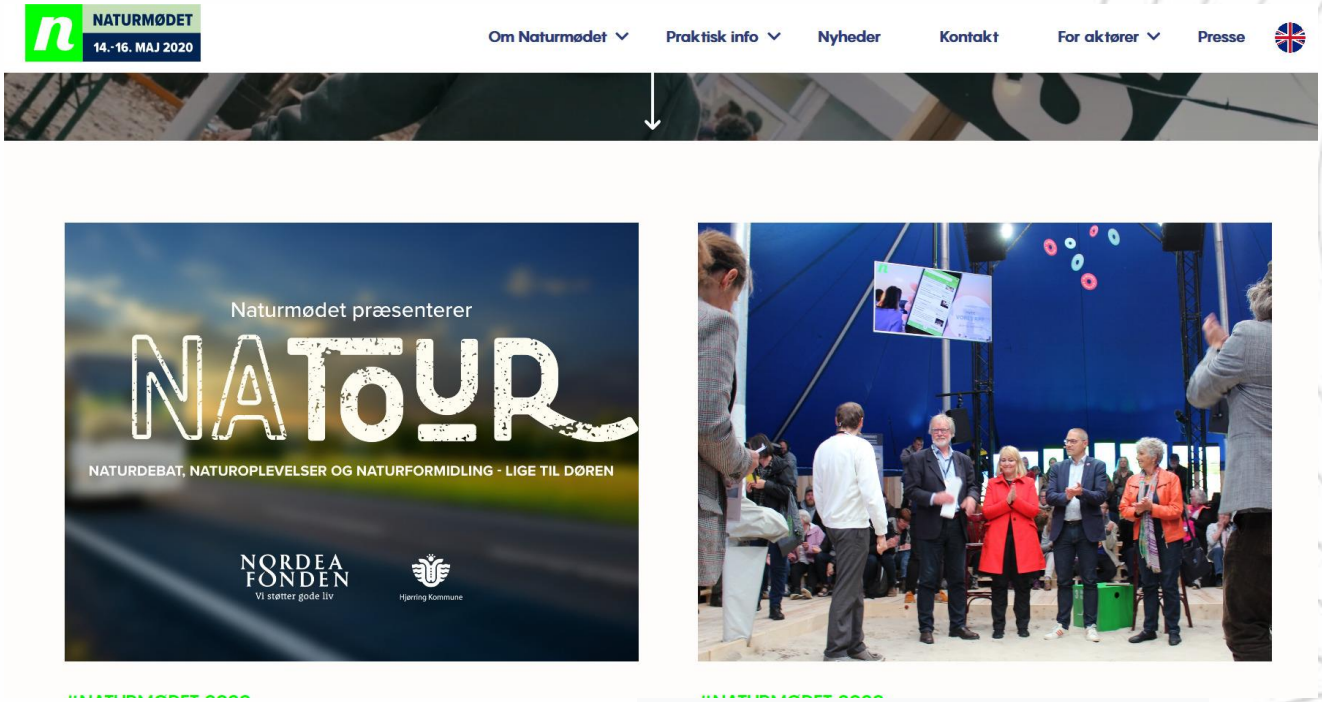
The Nature Meeting

Anders Pettersson



An open air event for science

Who makes it?

An organization called Naturmødet (Danish) with 8 co-workers, 26 sponsors (companies, authorities, NGO:s) and 17 ambassadors (scientists, politicians and teachers)

What is done?

The nature meeting is an annual national meeting about and in nature. For three days, the northern Jutland city of Hirtshals is transformed into epicenter for Danish nature debate and nature experiences.

The nature meeting is wind in the hair, bird watchers and the nature view in conflict. It is debate, activities and folk party, and here ecologists, conventional, curious, nature guides meet, children, politicians, scientists, winter bathers and mountain bikers. The nature meeting is - like nature - for everyone, and together we set the agenda for the nature debate in Denmark.

The desire for nature meeting 2019 was to reduce the distance between thought and action; that we can jointly become wiser on both nature and each other and, to an even greater extent, translate wishes for action into real choices about action for nature.

In the 2019 event there are three scenes/stages

1. Learn

A scene for professional communication and knowledge sharing. Here it unfolds unfamiliar, hard-to-reach or surprising. The focus must be on the latest knowledge and experience. Nature talks, lectures, workshops.

2. Life

At Life, the personal is in the centre. Knowledge and personal experiences are shared in a conversation, which is based on curiosity and interest in inspiring and being inspired - both giving and receiving.

2. Thunderdome

The scene unfolds debates across interest groups and political parties.

Since when?

3 years at different places in Jutland, Denmark. Next year at Hirshals.

What was the motivation to establish it?

It is important to link the debate on nature with activities where one can feel nature. Therefore, the Nature Meeting is a multitude of conversations, debates and experiences where guests, actors and volunteers give to each other.

The event wants to celebrate, change and strengthen people´s relationship with and use of nature.

To create an equal conversation and debate between people, scientists and decisionmakers.

Target groups are ecologists, conventional, curious, nature guides, children, politicians, scientists, winter bathers and mountain bikers

Offering spaces for dialogue and exchange

What makes it citizen science? How are learners involved and how is the practice connecting science and the society? (briefly).

The desire for nature meeting 2019 is to reduce the distance between thought and action; that we can jointly become wiser on both nature and each other and, to an even greater extent, translate wishes for action into real choices about action for nature.

It is a way for scientists, decisionmakers and ordinary people to learn from each other.

The rules for the three scenes are:

- Timeliness
- National relevance
- Edge

- Multiple angles
- Expand the horizon for participants and audiences
- Greater mutual understanding
- Contributions to common solutions
- Involve the audience actively.

During the Nature Meeting, there is a unique opportunity for school classes to experience some of the country's most knowledgeable, committed and talented mediators - including researchers, organizations, national and local politicians and others. At Nature's scenes Thunderdome, Life, Learn, Workshop and Roots, a presence of debates, conversations and presentations will be of relevance in social studies and biology especially for schooling and youth education. The young people will also have the opportunity to contribute their views on the topics discussed, especially on the Roots scene, which is specifically targeted at young people.

Methodological aspects

Using three scenes for conversation and debates, using simple rules, and providing information, rules and themes in advance to the participants.

S.W.O.T.

Strength

Organization built on non-profit, support from politicians and municipality, participation from research community and business sector, discussions built on equality.

Weakness

If conversations, debates and workshops don't meet the expectations of the sponsors and collaborators, they might become less interested.

Opportunities

New ideas on developing the municipalities, ideas for research, material (films, pods, prints) for schoolteachers.

Threats

Depends on funding, and ability to meet participant's interests. If nature becomes non-top issue the event ability to change is decisive.

More Stories

https://naturmoedet.dk/nyheder/

https://naturmoedet.dk/hoer-radiointerviews-fra-naturmoedet-2019/

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European Researcher´s night

Anders Pettersson

Making Mass Experiments

Researchers' Day is coordinated nationally by the association, Science & Public. 56 national and local organisations and universities are attending the event 2019.

In the Research Experiment's **Mass Experiment 2019, the Star Trial**, thousands of school students, outdoor groups, clubs, associations and private individuals will be able to contribute to research on light pollution while at the same time gaining knowledge about ecology, sustainable development and urban planning.

Street lamps, light signs and illuminated buildings - lights at night mean safety and nicer cities, but have also been shown that have negative effects for people and animals. The more light, the fewer stars you can see in the night sky. How many stars can you see where you live? In this year's mass experiment, you can help scientists measure light pollution by counting stars in the sky!

At the Researcher´s Friday site you can make reporting online and there is also an instruction on how to do a "protractor", an instrument used to watch the stars. The European Commission initiated European Researchers' Night in 2005, always on the last Friday of September. In 2018, 1.5 million visitors were reached throughout Europe and neighbouring countries. European Researchers' Night is funded by the European Commission and is part of Marie Sklodowska-Curie Actions, part of Horizon 2020.

It has been carried out each year since 2006. The first mass experiment was done 2009 and focused air quality in school classrooms.

FORSKARFREDAG
En del av European Researchers' Night

ResearchFriday creates meeting places and dialogue between researchers and the public, shows what science is, how research goes and how fun, exciting and everyday-close research can be. They want to challenge stereotypical notions of researchers and talk about how it really is to work as a researcher.

- Demonstrate research and innovation conducted throughout Sweden, in all areas of research and disciplines,
- Create meeting places and increase the dialogue between researchers and everyone who is curious about research and innovation,
- Stimulate interest in higher education, research and innovation among young people,
- Show what science is, how research goes and how it is to work as a researcher,
- Show the importance of research and innovation in everyday life and society.

The target group is the general public with a special focus on children and young people. Local and regional actors, such as HEIs, science centres, municipalities, regional associations, science parks, museums, archives and research centres, organize local activities.

In the mass experiments school students can attend and participate.

Promoting science and citizens cooperation

Give students the opportunity to participate in proper research, where they get an introduction to scientific method and an insight into the researchers' systematic working methods and to stimulate an interest in research.

Help researchers gather large amounts of data while participating in dialogue with participating school classes. Give teachers access to research-based materials and methods to integrate into teaching. Help the Researchers Peace organizers get attention in the media, to reach potential visitors and to stimulate the public's interest and understanding of research and science.

Many aspects are considered in the selection of experiments, such as feasibility (in terms of data quality, if it is possible for students of different age groups to perform the tasks in the experiment, and how interesting / fun / learning it would be for them), ethics and integrity issues, and that the experiment should preferably touch areas that feel relevant in the students' everyday life.

Methodological aspects

The method in the Star Trial, 2019 is involving students all over Sweden to do observations according to instructions from an easy accessible web page. Written documents and short films mediate the instructions.

Instructions on how to make tools are also mediated on the webpage.

The observations in the experiments are done at certain times between February 2019 and February 2020.

S.W.O.T.

Strength

Involving school students, authorities, universities and researchers. Supported by European Commission. Easy to attend and participate. Easy for teachers/learners to use, a comprehensive report each year (with info graphics). Been going on for more than 10 years and growing.

Weakness

Depending on funding and the commitment of authorities. Depending on that enough organizations and people participate and that participants/observers are spread out in the country.

Opportunities

Working all over Europe. A way for the EU to get valuable information, on for example environmental issues.

Threats

Depending on authorities will to fund the event. Not good enough results for science and researchers.

Which aspects are transferable?

The mass perspective, using school students to collect data in a simple self instructing way. Using the result as a resource for teaching.

Observing Ladybugs

In 2018 a the event was training an application by providing photograps of Lady Bugs

From an AI perspective, the Ladybug experiment was very successful and has generated mass of important information. Because AI robots perform better the more data you have access to in the training you need as many pictures as possible. The more pictures the better. In the databases that exist today with pictures of plants and animals, it is quite limited with pictures of ladybugs. In the largest database, GBIF (Global Biodiversity Information Facility), before the Ladybird trial, there were 100 pictures of Swedish ladybugs, collected in the last 20 years3. Instead, when the Ladybug Trial images are added, there will be almost 5,000 pictures! These images will represent 20 percent of all ladybug images available on GBIF from around the world. The fact that we have now collected so many pictures in just one summer is a fantastic addition and an important resource for other researchers who are interested in spreading keychains, or by developing AI robots.

Involving society into science and research

The Researchers Friday is supplying research with valuable information, it creates a learning process for school students and teachers, anyone can participate and you don´t need economic resources to do it.

It´s really a mass experiment involving all from university professors to everyday man.

It´s really easy to access information and results and to sign up.

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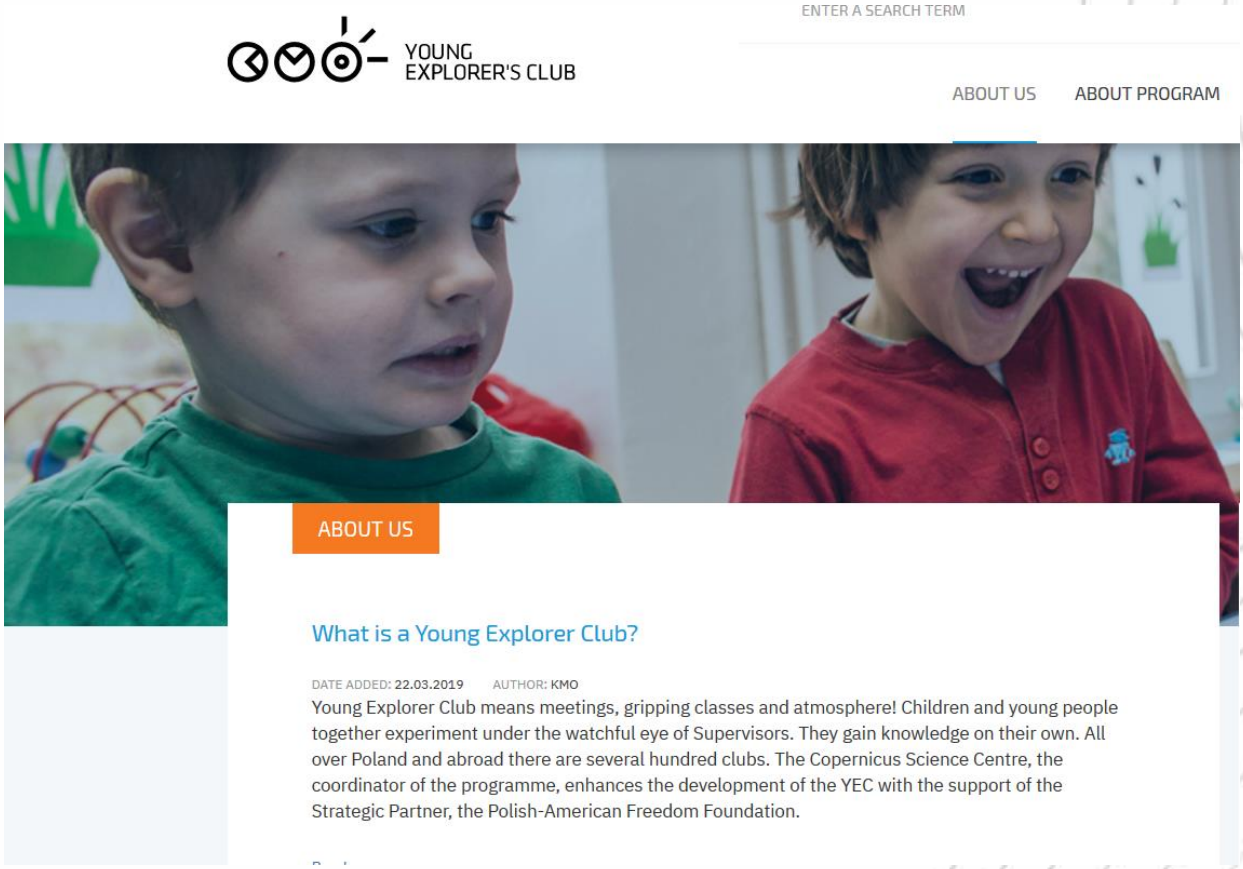
YOUNG EXPLORERS' CLUB - Klub Młodego Odkrywcy

Hanna Penkalla



Clubs for all little explorer

Young Explorers' Club (Klub Młodego Odkrywcy) is an educational program coordinated by the Copernicus Science Centre (Centrum Nauki Kopernik) in Poland. The program was launched in 2009. It is destined to children and young people who, under supervision of teachers/ coordinators, explore and gain new knowledge through experiments and research. Clubs can be opened anywhere in Poland or outside the country, independently of the formal education system and they can be conducted by teachers, parents, animators and anyone willing to involve in Club's activities. Presently there are over 700 active clubs. Together they create a large network allowing its members to share experiences and know-how, plan joint activities but also use a common on-line repository of lesson plans and participate in various events. Club supervisors meet a couple of times per year

at the Copernicus Science Centre for the occasion of workshops, conferences, Science Picnics and during the Young Explorers' Club Forum.

Every Club – another local focus

This project links society and science through its openness and adaptability. It offers possibility to create a Club or become its member to anyone interested and it does not require any specialized equipment. The program contributes to creation of new knowledge and resources by establishing an on-line platform where anyone can publish their lesson plans and ideas. It also gives space for knowledge and experience sharing through participation in events and meetings organized for members.

The educational method itself is an example of citizen science idea: through experiments, learners become their own teachers whereas teachers can become learners in the process.

Pedagogic aspects

The program's formula is very open and can be adapted to any environment. The minimum number of club members is 3 and it requires at least one supervisor. The members' role is to actively seek answers and learn through creative exploration and research. The supervisors' role is to create space for young people which is safe and favorable for gaining new knowledge and competences and can foster their personal development. Supervisors should allow members to conduct experiments and make discoveries on their own.

The research method that the program is based on, aims to develop many competences and skills at the same time; allows to exceed the boundaries between school subjects and shows that making mistakes is valuable, as they teach us to solve problems.

The subject of research undertaken by Club members – depending on the children's age – may be experiments with magnets, observation of the Universe, analysis of water quality in the nearby river or any other topic related to the STEAM (Science, Technology, Engineering, Arts, Mathematics) fields.

There is no requirement for specialized tools or materials to be used in the learning process and the lack of laboratory or scientific equipment is not an obstacle.

Objects that surround us – available in the kitchen, in the garage, on a walk or in the garden – can constitute great tools for experimenting.

S.W.O.T.

Strength

- Clubs can be started anywhere
- No special equipment or financial input needed
- Support from the Copernicus Science Centre
- Allows participation in conferences and other events, being a part of a network

Weakness

- Success of each particular Club depends mostly on its members and supervisors, their creativity and involvement
- There is no external supervision to make sure that the Club idea and method is correctly implemented

Opportunities

- Need for new ideas and models in the education
- Good opportunity for children unable to participate in traditional extra-scholar activities (due to lack of financial resources, inconvenient location, etc.)

Threats

- Young people are often overloaded with educational activities in schools which can result in lack of interest in additional classes

Which aspects are transferable?

The educational model applied in the program and in Clubs activities can be used by other institutions. The method is based on the alternative approach to education seen as a bottom up initiative. Thanks to a large database where knowledge can be shared and to meetings which foster the exchange of information, anyone can become an educator. The learner therefore is placed in the center and has the main role in the process, discovering new knowledge on his/her own.

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Anyone is a teacher and learner at the same time

The most important elements allowing to include the idea of Young Explorers' Club into the "smart practices" list are its accessibility and ability to combine both simplicity and innovativeness. It implements innovative solutions such as on-line registration of new Clubs and resources sharing platform while keeping the program's idea clear and accessible. It promotes an alternative educational model in which anyone who is passionate about science can be a teacher, a learner and – better even – can assume both roles simultaneously.

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Community reporting

Rimante Rusaite

Giving people a voice and gaining insights

Community Reporting is a storytelling movement that was started in 2007 by People's Voice Media, and it uses digital tools such as portable and pocket technologies to support people to tell their own stories in their own ways. Using the Internet to share these stories with others, it connects people, groups and organisations who are in a position to make positive social change. Central to Community Reporting is the belief that people telling authentic stories about their own lived experience offers a valuable understanding of their lives.

We find this method very transferable and adaptable and it's been applied in various contexts successfully.

Letting people tell stories about their reality

Through creating spaces in which people can describe their own realities, Community Reporting provides opportunities in which people can:

1. Find their voice
2. Challenge perceptions
3. Be part of a conversation of change

In the context of Scie-Citizens project, we believe that CR has a potential to connect scientist and citizen communities, start dialogue and co-create research topics and science communication strategies, that are relevant in specific environments.

Methodological aspects

Community reporting is based on storytelling and simple insight techniques: snapshot stories and dialogue interviews.

It does not require very specific materials, just a smart phone with a camera or a voice recorder is sufficient to capture the story.

We believe that community reporting could be used to explore the citizen expectations from scientists, or even citizens could approach scientists directly, in order to understand complex scientific messages better.

S.W.O.T.

Strength

It is a very simple methodology, yet has a big potential. CR does not require any specific equipment and is very adaptable and accessible.

Weakness

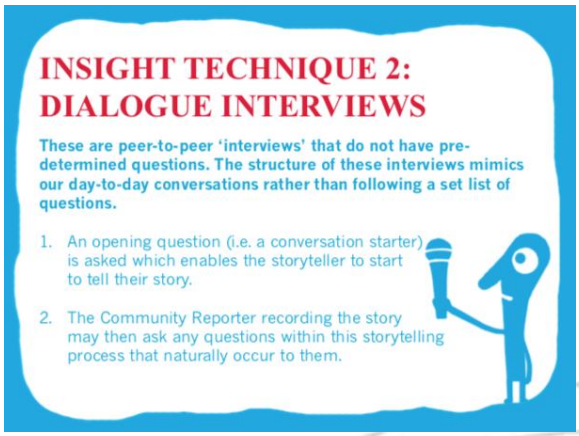
It does not directly deal with any specific science discipline and depends on how well it fits specific needs of the community in order to create impact.

Opportunities

It can be easily combined with different methods, e.g. social research, policy research.

Threats

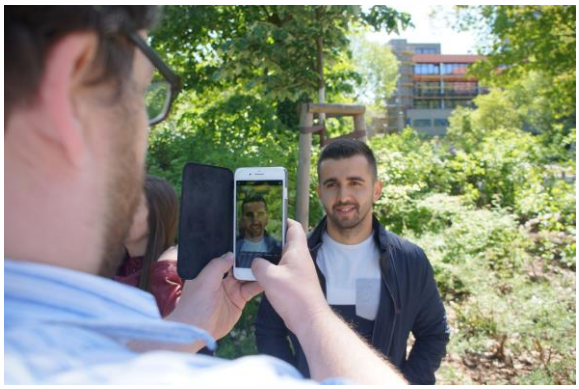
Data safety, information manipulation, takes time to build trust



Which aspects are transferable?

The storytelling can be used in various situations, depending on the needs.

It is possible to use only snapshot stories insight technique or dialogue interview, depending on the time availability.



VOICITYS – collecting neighborhood perspectives on diversity

CR was successfully used in a big international project Voicitys.

The VOICITYS project is combining social science research techniques and Community Reporting methodologies to support the development of policies and practice that benefit diverse communities in Salford, UK; Berlin-Wedding, Germany; Sassari, Italy and Budapest- Józsefváros, Hungary. The project is co-funded by the European Unions`Rights, Equality and Citizens Programme 2014-2020.

Working with residents of diverse communities in these countries, the consortium consisting out of People's Voice Media, Comparative Research Network, Mine Vaganti NGO, the Institute for Regional Studies at the Hungarian Academy of Science have trained people as Community Reporters and equipped them with the skills to tell, understand and share their own stories on topics and issues pertinent to diversity in neighbourhoods.

A method to easily involve anybody

Community reporting is a very versatile and adaptable method and can be used in various contexts, environments and with different groups.

It is very simple to understand and can be combined with other methods.

As CR does not require any specific materials, it is very accessible and inclusive.

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4 forces of Nature "Avatar" project

Raminta Žukauskaitė, Tautvydas Rušas

Learning STEM through a cartoon

The project 4 forces of Nature was first implemented by "Vytautas Magnus University" academic youth science association "Modusas" in 2018. With this method, participants can improve their knowledge about the science of nature – biology, chemistry, physics, and ecology during lectures and interactive workshops.

"Modusas" association members were talking about the "Avatar" animated movie during the meeting and were joking that the cartoon is perfect for lovers of Nature science because there we can explore the importance of the four elements: earth, water, air, and fire. Inspired by "Avatar" story, organization members decided to show high school students that nature sciences can be interesting and useful.

We noticed a reoccurring problem in the current school system - students acquire a lot of theoretical knowledge, without knowing how to apply it in their everyday lives. There is an ongoing opinion, that science is boring and hard to understand.

Communicating natural sciences in an engaging and interactive way is the main purpose of "Modusas". By doing that, the organization aims to spark interest in the field and attract more students to choose it as their future career.

This project is designed for high school students and teachers. But this theme is relevant to everybody. And the frame of the project can be transferable to other themes.

Learning to look beyond the elements

Everybody knows what water, air, earth, and fire is, but not everybody knows about chemical, biology or ecological aspects going on in these elements.

During the kick-off co-creation/inspiration session the "brainstorm" method was used including the participants in order to find out, which themes are of interest to project learners.

Project participants had full access to the "Vytautas Magnus University" laboratory equipment, to learn about the 4 elements of the Earth.

A trivia night - "Protų mūšis" was organized to evaluate the newly gained knowledge of the participant. After the project has ended, participants were asked to submit feedback: what was interesting, useful, or useless, and what would have to be done to improve the overall experience. When asked, the majority of the participants agreed, that we should arrange a similar project next year.

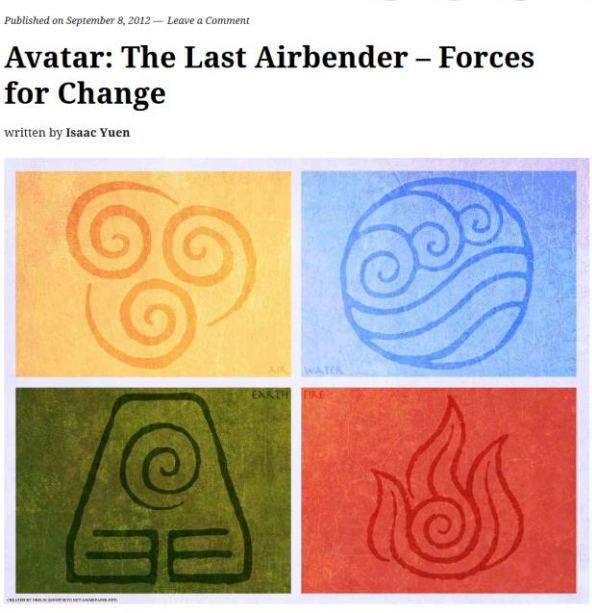
Methodological aspects

In total 8 lectures were conducted: 4 theoretical and 4 practical, at the end of which, the results of the studies explored during the project were presented.

We use: Co-creation (kick off phase), Non-formal education, Experiments, Experiential learning

The project lasted for one month, activities were held once a week on Saturdays.

Preparing the methodology for each element as well as finding people interested in participating in the project, an organized team, that excels in communication is required.



S.W.O.T.

Strength

Inspiration for the project was drawn from a piece of modern media, that most young people can relate to. The organized activities are implemented in a non-formal fashion, creating a friendly environment for participants.

Weakness

Because the project was completed in a month, the amount of information provided during the activities can be overwhelming.

Opportunities

Participants have the opportunity to help create the project itself, learn to apply instantly the knowledge gained, and also get to use laboratory equipment required for scientific research.

Threats

Considering that the activities take up most of Saturday the method requires motivated people from both the organizers and participants.

Which aspects are transferable?

All aspects can be transferable as long as it is used for non-formal education – methodology (Co-creation (kick off phase), Non-formal education, Experiments, Experiential learning) and putting a learning experience in a relatable context (depending on the age or other specific of the target group)

Connecting popular culture with science

A workshop in this specific format has been implemented only once. However, the fact that all the participants came to every module, could be considered a success. Furthermore, "Avatar" got positive feedback from both student participants and teachers, and will be implemented in the coming semesters.

An Experimental Experience

This method uses non-formal education and experimental learning to connect students and teachers, supplementing knowledge to students, which they otherwise would not get in school, in a fun and interactive way, using theoretical lectures, which are instantly applied in the workshop, and can be applied later in life

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NON–FORMAL EDUCATION - "Students, find out more!"

Judita Paulionyte

Students promote science

The project was created by student organization "Modusas" in 2017 autumn. Scientific work and experiments conducted by members of organization, often in collaboration with school's administration or teachers providing non-formal science classes/lessons for students.

Non-formal education can be a very useful 'tool' for spreading word about natural science.

The objectives of our activities and goals are to raise awareness about a scientific theme (i.e. the importance of native and exotic animals, dangerousness and diversity of chemistry work among adults and youngsters), also to promote natural science in academic society and motivate scientific communication.

Involve inexpert people/university students in creating science lesson/classes by contributing to science in a fun and easy way.

The target is based in local level and enhance active participation of the community between university students and school students and their teachers.

Working with pupils and teacher

We focus not only spread the word to kids but also show the way to teachers how children can be involved in science and be active during the class. We are trying to inspire teachers to use more non-formal education in schools, organize events that are focused on science. Because nowadays some of the teachers still are old fashioned and conservative and do not use more interesting activities during classes or combine all nature science.

Methodological aspects

THEORETICAL PART: provide information and simplified methodology of chemical, physical reactions, scientific process of experiments or introduce to scientific terms or tools by explaining using simple words.

PRACTICAL PART: University students of nature science organize activities for school students in which they introduce nature science in non-formal ways and show that science can be fun and interesting. Letting children touch equipment, reagents and even do by themselves experiments. Also sometimes bring small animals in class. (ex. Live snake, hedgehog, spiders or insect collection, different animals' skulls and etc.)

S.W.O.T.

Strength

We aren't using power point presentation or videos because it won't give the effect we want to give to children. Instead of videos, we show it for real, how does reaction is happening, that not always it works the we want, how specific and detailed everything must be to make science work. We tell how the work looks like in laboratories and what kind of skill you will be able to have. We approach children in friendly and non-formal way so they could feel that science can be fun and interesting that you can improvise and add input to it. We try to connection all nature science and talk about it.

Weakness

Sometimes we university students are do not have enough qualification to give and spread best knowledge or information, but we also are learning at the same as children.

Opportunities

At the end of lesson, we ask as well as receive questions, repeat main points of our presentation, together make a conclusion what both sides learn. Also, participants answer questions about the impact of the method/activity in their future behavior and about what they have learnt. We should ask teachers to give us feedback about our form of work with children and preparation.

Threats

School children during our activities and presentations are still not interested or not paying attention. Worst scenario during one of experiments would gone wrong and someone would be hurt. But we do not make dangerous or very difficult experiments and take safety actions.

Involving classrooms

During the implementation of this smart practice in one of lessons with 9th grade students group of boys were not involved and interested in our workshop, but when we let one of them use our equipment to do one experiment, he was not only fascinated but also got more curious about it. He started asking questions "Why? How? Can I do it again?", which even made other boys try do help us with materials and substances. Encouraging one person can give an example to other people and it will spread.

Increasing participation in science

By trying to increase participation in scientific field by letting know what kind of parts of science is interesting and fun, can fascinate and makes our world a better place to live in.

The involvement of students in academic world is a key factor to the success and long-term sustainability of growing science.

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4

CO-CREATION OF NEW KNOWLEDGE

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HackYourDNA - Molecular Genetics Workshop

Max Kushnir

Participants learn about molecular genetics

HackYourDNA is a workshop in molecular genetics. Participants with no scientific backgrounds learn genetics by performing an actual wet lab experiment on their own DNA. The workshop is delivered since 2016 by Max Kushnir, a geneticist and co-founder, of BioHubIL- Israel's first community Bio lab.

As of 2019, human knowledge doubles itself every twelve months. The internet made this information more accessible than ever. There is a problem however, opinions and facts are often mixed together and laymen have little means of distinguishing between the two. Science offers us an impartial method to generate evidence-based factual knowledge. Scientific materials however, are often complicated to understand for non-scientists. By making science accessible to non-scientists we can ingrain curiosity and bolster critical thinking.

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The HackYourDNA workshop is meant for people who are curious about science and genetics but prior knowledge is not required. since inception, the workshop appealed to variable audiences. From seasoned tech entrepreneurs to theater director and a six-teen year old high school student.

Because the workshop is conducted using a portable state of the art molecular biology lab (see: *bentolab*) it can be done anywhere in the world for a group of up to 20 participants.

Explore your own DNA

HackYourDNA resonates with citizen science core values as it lets people from all walks of life preform high end molecular biology experiments. Participants learn complex scientific materials in a hands-on way. Because participants experiment on their own DNA, they get more engaged and ask for context regarding the outcome of the experiment. Meaningful discussion about the implications of modern-day genetics on society often take place.

Pedagogic aspects

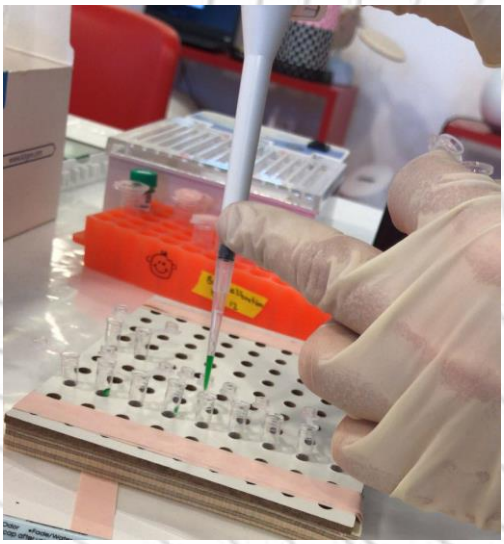
In the workshop, participants learn the basics of human inheritance and genetics by performing an experiment using their own DNA.

participants are introduced to basic techniques of genetic analysis, aimed at determining the genotype of a specific phenotype. With the Mendelian, dominant genetic trait of PTC tasting as an example, tasters and non-tasters extract their own DNA and determine their genotype by using state of the art molecular biology techniques.

Time is be allocated for discussion about the practical implications of the genetic background of every participant.

The workshop consists of two 5 hour sessions both theoretical and wet lab.

No preparation is required on the participant side. The person conducting the workshop



has to have an extensive training In genetics and safe laboratory practices.

S.W.O.T.

Strength

Participants with no scientific backgrounds learn complex scientific materials. They experiment on themselves which makes them more invested in understanding the material. There are plenty of opportunities for meaningful discussions and participants continue to discuss and ask questions in dedicated chat groups long after the workshop is over.

Weakness

The cost of this workshop is 100-150 euros per Participant.

The workshop can only be delivered by a highly trained professional.

Opportunities

Participants learn with their hands and get the opportunity to experience a very new way of learning. This is unusual for the field of genetics and exact sciences in general. In these disciplines the standard method of teaching is through lectures which can prove to be much less engaging.

Because no specific background is required, this workshop can be delivered to extremely diverse audiences.

Threats

The workshop has limitation to scalability because of price and level of expertise required for delivery.

Which aspects are transferable?

The first, theoretical part of the workshop is conveyed as a lecture and a series of quick interactive quizzes (using *Kahoot*) and discussions. At the end of this session we perform a PTC strip tasting experiment which involves tasting a strip of paper dipped in Phenylthiocarbamide. This is a standalone session that can be transferred and done as an exercise with large groups of people. The wet lab part of the workshop is more difficult to transfer.

Helping pupils to find their way into science

My youngest student was a 16-year-old high schooler. After taking part in HAckYourDNA 2018 she decided to major in Biology. She recalled her experience form the workshop was one of the factors for her decision to peruse a carrier in the life sciences.

Anyone can do high level science

HackYourDNA empowers people from all walks of life to engage and preform in high end science. The methods used in the workshop are state of the art in the field of genetics. Learning high level molecular biology in a hands-on way is a novel approach for democratizing science.

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Students used bees to monitor local pollution

Giovanni Blandino

Measuring Pollution through bees

In 2017, 50 students from the high school Liceo Scientifico Ulivi in Parma, Italy, led by their teacher Ilaria Negri, used bees to monitor the levels of fine dust pollution in the industrial area of the city.

Honeybees are bioindicators of environmental pollution levels. Atmospheric particulate matter is in fact "captured" by the body of the foraging bees in flight.

The students investigated the head, wings, hind legs and alimentary canal of the bees living in the area under observation using a scanning electron microscope (SEM) coupled with X-ray spectroscopy. They discovered different polluting components and, through further analysis, they identified the sources of emission of pollutant dusts and their degree of toxicity to health.

To fund the project, a crowdfunding platform was used involving 76 backers among the citizens that the students kept

informed during the whole period of activities.

Students may now work on similar projects analysing other areas with a critical environmental impact, thus propagating the method to other schools and territories.

Research, Collecting Data and Discussing Pollution

The main purpose of the project is didactic-training. The students approached the scientific methodology personally by planning a research activity, collecting data, re-elaborating it and discussing it on the basis of the scientific literature.

The project also allowed students to deal with wide-ranging environmental issues, such as the impact of pollutants and their effects on public health, the use of bio-indicators for monitoring activities, the importance of pollination as an essential prerequisite for our survival and for the maintenance of biodiversity."

Finally, the project encouraged the students to increase interactions with citizens, the society and the territory.

Pedagogic/methodological aspects

How does the method work?

- Beekeepers installed beehives near the area under observation.
- From these hives, in collaboration with entomologists, the students took specimens of forager bees at the end of their life. Forager bees are the most exposed to pollutants.
- The powders collected from the bees were prepared by the students in the Chemistry Laboratory of their school using stereoscopes and other laboratory equipment.
- Other particulate analyses were carried out at a specialised university laboratory in the presence of the students, using a Scanning Electron Microscope equipped with an X-ray probe. This tool has also made it possible to observe the morphology and analyse the chemical composition of the pollutants. So they could identify the sources of emission and their degree of toxicity to health.

- Other hives were placed in a so-called control area: a green area on the Parma hills, away from sources of pollutants. So that they could compare the fine dust collected by different families of bees.

S.W.O.T.

Strength

Students were personally involved in applying the scientific method.

Students had to interact with different local players: beekeepers, staff of the scientific laboratory, citizens who financed them.

Weakness

The method is quite complex and takes a long time to be organized and carried out.

Opportunities

The method leads the youngest to see and analyse the world (and the society) from a scientific perspective

Students are encouraged to discover their own territory and the people who work there.

Threats

The analysis of samples can be expensive, so that not every school could afford it.

Which aspects are transferable?

The methodology is completely transferable to other areas. Indeed, it is desirable that such projects will be carried out in the future in contexts with a high environmental impact or where pollution is a possible threat to public health as it is already discussed by citizens and administrations.

Beekeepers start to cooperate with schools

The beekeepers who were part of the project and worked together with the students belong to a cooperative that employs refugees. This gave an ethical-social perspective to the project and allowed the students to get in contact with a further, important part of the social context of the city: the migrants.

What makes it a smart method?

The project has several positive consequences from a scientific, social and pedagogic point of view. It can explain to students and citizens what the scientific method is by making them experience it first-hand and showing its possible effects on

society and on the choices of politics. It is innovative because it combines different aspects in a single, yet complex activity, such as biomonitoring, crowdfunding, scientific analysis of specimens and the interaction with different players in the territory.

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Open Schools Journal for Open Science

Eugenia Kypriotis

Open Schools Journal
for Open Science

https://ejournals.epublishing.ekt.gr/index.php/openschoolsjournal/about/www.ea.gr

A Peer-reviewed scientifc journey for school age students

The Open Schools Journal for Open Science is the first European peer review scientific journal which accepts original papers written by school age students from Primary to Secondary schools across Europe under the mentoring of their Teachers on all aspects of Science, Engineering and Technology. Students and Teachers via school projects produce scientific data that are invited to be published in this journal. The Journal publishes articles on a regular basis. Publication is free of charge.

The Journal is supported by the Openaire Advance Project and the Open Schools for Open Societies project both funded under the European Commission.

Citizen science in action

We all know researchers conduct their research inside Research centers, Universities, Companies, in nature, oceans even in Space.

We also know that very often students with their teachers become researchers too while they conduct research in their classrooms, school labs, streets or close communities producing results worth sharing!

Once experiments are finished, samples are gathered, trials are made, researchers draw conclusions and make discoveries. *These findings are important to be shared with the rest of the world and this is what we have been working on!*

Pedagogic aspects

Learning how to conduct research is one thing. But researchers need to explain what they did, why they did it, what did they find and what is left unanswered.

In the same way as researchers share their work, students who conduct research at school can also now share their findings with the rest of the world. In the exact same way as researchers do. Via publishing their results in a real scientific journal.

S.W.O.T.

The Open Schools Journal for Open Science is the first attempt to present scientifically accurate, original and reviewed research prepared by school students from Primary and Secondary School from across Europe.

The standards set by the journal team means that students and teachers have to work a lot to present their work in the Journal and therefore guidance is offered throughout the procedure.

The plan is to target to even bigger school networks to present them the Journal and the choices the Journal offers: either as users by using the open and free scientifically accurate papers or by providing

their research work and have it published under a future issue of the Journal.

Pupils contributing with scientific publications

The Journal is a great example of how students can actually offer to the scientific community not only by providing data through their daily routine, but also by conducting research themselves and getting involved. Amongst the papers published in the Journal, there are some that according to Professors, who have reviewed the articles, they could be published in popular journals in their fields. And that is a gain both for the research currently carried out, but also in the form of inspiration to the students through the sense of accomplishment.

A platform to share knowledge

The Journal is a very special case of a citizen science paradigm where research is more than just carried out by citizens - in this case students. The innovation is that the Journal acts as the platform to spread the word to even bigger audiences.

Funded by the Erasmus+ Programme of the European Union

SPARKS: Rethinking Innovation Together

Stephanos Cherouvis

SPARKS

RETHINKING INNOVATION. TOGETHER.

Engaging citizens with RRI

Sparks aims at engaging European citizens with the concept and practice of Responsible Research and Innovation (RRI). Sparks brings together organizations such as science centres and museums, universities, research centres, science shops, and local administrative entities to produce travelling exhibitions, public events, and policy recommendations on how to best communicate about RRI with citizens. Sparks received funding from the European Commission under the framework program Horizon 2020 and run from 2015 until 2018. The project focuses on a topic of inherent interest for everyone: "technology shifts in health and medicine". Using examples and case studies from health and medicine, Sparks engages the public in conversations about the mutual and shared responsibilities of all parties that are active in scientific research and innovation. Sparks aims to facilitate discussions of the complex issues surrounding contemporary science in health and medicine, topics that are of immediate particular

relevance for the public. It also aims to illustrate RRI in action.

Bridging the gap between science and society

Sparks addressed the gap between the super-fast pace of scientific innovation and society through a unique touring exhibition and a set of participatory activities. The project spanned all 28 European Member States and Switzerland. The innovative formats of activities created by Sparks trigger interaction between citizens and researchers. The ultimate aim is to involve the public in Responsible Research and Innovation (RRI): The European Commission defines Responsible Research and Innovation (RRI) as the 'societal actors work together during the whole research and innovation process in order to better align both the process and its outcomes, with the values, needs and expectations of European society.' In a broader sense, RRI is 'taking care of the future through collective stewardship of science and innovation in the present. By bringing together researchers, citizens and other stakeholders, Sparks activities have created opportunities to improve the connections between researchers and citizens, to identify priority research questions and to co-design scientific solutions that are closer to societal needs and concerns.

S.W.O.T.

Strength

This approach to Responsible Research and Innovation mobilises actors from society, research, industry, policy and education to take up new and alternative forms of knowledge, thus enhancing the knowledge-base and understanding of systems, processes, as well as the consideration of possible impacts. This will enable a people-centred design where human values are better embedded in the R&I design process. It builds capabilities in citizens and CSOs as active agents for shaping the future of society and developing solutions for the grand societal challenges

Weakness

The concept of RRI and its relation to citizen science is rather difficult to grasp and many often face issues when attempting to introduce it in mainstream contexts and the public sphere. In addition, accusations

towards citizen scientists over issues of authority may also undermine Sparks-like approaches.

Opportunities

Sparks offers an array of opportunities to the public to engage with both the concepts of RRI and Citizen Science and with actual processes and initiatives addressing issues and challenges in science and technology. It also offers a number of tools and ideas to citizens wishing to conduct their own methods and actions and build strong communities of change agents.

Threats

Negative attitudes towards the scientific enterprise, the rise of populism and cynicism, lack of trust, the increasing power of unaccountable actors with a tendency to rogue behavior, such as large corporations, antidemocratic sentiment, anti-climate change rhetoric, all pose serious threats to both Sparks and its enthusiasts. It is extremely important for anyone interesting in this approach to citizen science to remain watchful to such developments and to strive to build long-lasting communities and networks that may collectively face such threats.

A wealth of tools & ideas

Sparks has produced a number of key documents with tools and material that easily transferable across relevant contexts (education, the market, activist groups, NGOs, etc.).

The Key Policy Recommendations from the Sparks project: European, national and regional policymakers are invited to reflect on how they can be integrated into policy and implemented on the ground. The recommendations were drafted by the Sparks consortium and validated by 150 participants

The Sparks handbook is an easy consultation texts that guides interesting parties in the implementation of various novel ways to accelerate public engagement with citizen science and RRI. Citizens and professionals may use this to run engaging Science Espressos, eyes-opening Reverse Science Cafés, Pop-Up Science Shops, Scenario or Incubation Workshops. All these are new formats of developing public meaningful activities. The Sparks Toolkit is a playful tool to choose and implement successful participatory activities engaging citizens and multiple stakeholders in the practices of Responsible Research and Innovation. It supports citizens to understand the differences between the types of formats in terms of resources and engagement level, it offers practical advice on developing the most suited formats, tailored to your profile and objectives and it provides concrete examples of how to deal with the topic of RRI through public engagement activities methodologies.

The Mosquito Mappers

In recent years an increasing number of so-called 'Citizen Science' projects have been launched where scientists and the public work together to make new scientific and medical discoveries. Some of these initiatives focus on data processing and take place in the virtual world – often in the form of online games – while others actively involve people in collecting data, and even in the design of experiments that respond to community needs and local issues.

Mückenatlas (Mosquito Atlas) is a German scientist-led project that enlists the help of ordinary citizens to track the distribution of mosquito species across the country. Members of the public catch mosquitoes in their homes and gardens and then send them in to participating research institutions (along with infor-mation on location, time and weather conditions). To date 5,000 people have participated in the project, with more than 17,000 mosquitoes collected in total and two invasive species discovered (the Asian bush mosquito in 2012 and the Asian tiger mosquito in 2014). Both species are potential carriers of dengue fever and West Nile virus and so the information on their distribution is being used as the basis for public health decisions and for modelling the spread of these diseases in the future.

Why Sparks?

Sparks is a rather unique approach to citizen science and RRI with a strong emphasis in capacity building and diversification. Sparks has proven that when policymakers, researchers, etc. engage in dialogue with citizens and take into consideration their opinions and experiences, individual citizen empowerment increases and has spill-over effects on their desire to be involved in other democratic participatory activities.

5

CREATING POSITIVE CHANGE

Funded by the Erasmus+ Programme of the European Union

PISEA – Promoting Intercultural Science Education for Adults

Eugenia Kypriotis

Supporting Science Centres

PISEA focuses on building an innovative compilation of measures and tools for science centers and other adult science education institutions to strengthen educators' intercultural competences, offer science learning activities which promote the development of key competences of refugees and migrants, and become places for intercultural dialogue between refugees, migrants and the host society.

Creating tools for implementing citizen science

PISEA will not be limited in setting the theoretical framework for intercultural activities, but it will invest a lot on the production of the following tools:

Intercultural Key Competences

A Definition of Intercultural Key Competences of Science

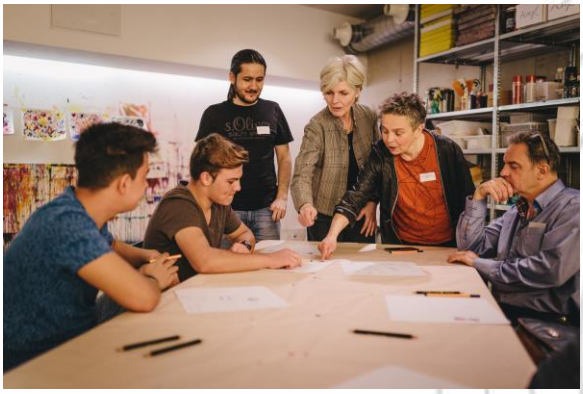
Educators/Explainers. This will provide a basis for science centers and science museums to identify the potential training needs of their staff in order to raise the intercultural quality of their programmes.

Training Resources for Intercultural Training of Science Educators/Explainers

Training Resources for Intercultural Training of Science Educators/Explainers. This concrete and innovative tool aimed at the science museum and science center community will aim to improve their staff competences in view of using science education for social inclusion and intercultural dialogue and in view of promoting science literacy and key competences of diverse groups of refugees and migrants through science activities.

Handbook for Adult Science Education Institutions

Handbook for Adult Science Education Institutions. The handbook/toolkit will serve as a quick-start toolkit for institutions interested in improving their institution as inclusive science learning places for adult refugees and migrants and in offering relevant science learning activities. The handbook will e.g. include good practice examples and lessons learned from intercultural small-scale activities, an intercultural/diversity scan for science centers and museums.



Which aspects are transferable?

All these tools will be available in English, Greek, German, French, Swedish and Italian so that they can be used by science communicators as well as other staff through awareness-raising, development of resources and specific trainings. In that manner refugees and migrants will get involved in learning procedures through providing an encouraging, welcoming, and low threshold setting.

PISEA

Promoting Intercultural Science Education for Adults

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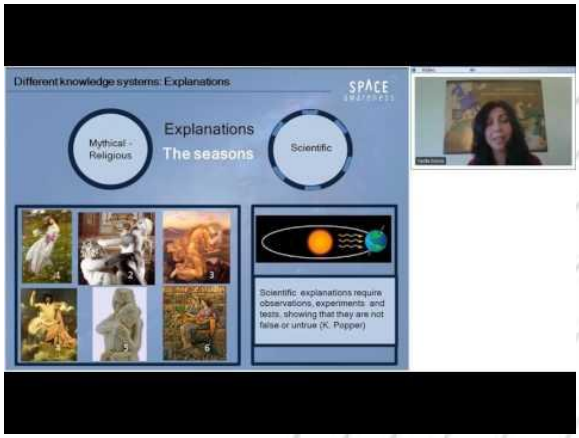
Pedagogic aspects

With the ongoing refugee crisis, European societies are facing their greatest transformation and challenges for the last decades. It is widely acknowledged that education plays a decisive role for successful integration of disadvantaged groups in society.

In this case science centers/museums have a crucial role to play in offering low-threshold adult science education, and in strengthening of key competences of refugee and migrant adults. The project aims at improving science centres and museums as places for adult science education in an intercultural and inclusive perspective.

Working on science for refugees

PISEA has a uniqueness in the manner that science education is approached: it develops and disseminates measures and tools for science centers and other adult science education institutions to strengthen educators' intercultural competences, offer science learning activities which promote the development of key competences of refugees and migrants, and become places for intercultural dialogue between refugees, migrants and the host society.



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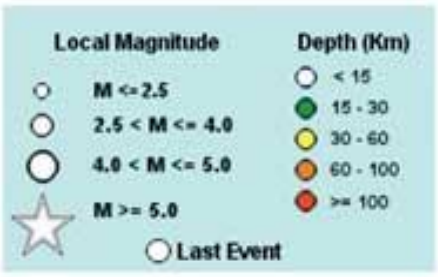
Schools Study Earthquakes

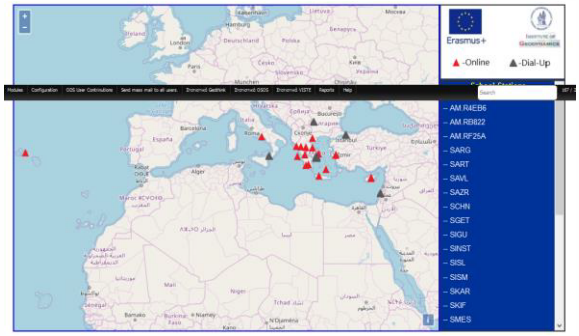
Nikos Zygouritsas



Seismology for the classroom

Seismology in school education can promote scientific literacy at all levels but its benefits go far wider than simply providing scientific knowledge about this natural phenomenon. It provides the basis for informed action to protect lives and property on local, regional, and national levels. "Schools Study Earthquakes" aims to help schools become open hubs of innovation, education, training and information for their local society. An open school will be in constant interaction with the local community and evolving as its equal social partner. This school is following the echo of the problems of the local community and reacts accordingly. It plans and implements projects that increase the science capital of the local citizens. In our vision students through their projects are developing solutions for early warning systems, seismic activity monitoring and civic protection awareness activities. Thus, all societal actors interact with the research and innovation process with the purpose to align both the process and its outcomes with the values, needs and expectations of the European society. This is the core of the so-called concept of Responsible Citizenship and Responsible Research and Innovation.

Developing awareness of this in school education is considered of pivotal importance for long-term impact. In this respect science education through inquiry and project-based learning methodologies are strongly related to the 21st century skills that present school students and future citizens need to develop in order to become innovators by co-creation, collaboration and critical thinking.



Studying earthquakes for pupils, delivering data in citizen science

“Schools Study Earthquakes” adresses the challenge of the study of a physical phenomenon with great societal impact and proposes pedagogical practices based on inquiry-based methods that are more effective in science education. The objective of this combination is on one hand to increase children’s and student’s interest in science, on how science is made and how it affects everyday life, and on the other to stimulate teacher motivation on up-taking innovative teaching methods, subjects and practices to enrich and renew the science curriculum.

The key is to provide increased opportunities for cooperation and collaboration between schools across European countries (mainly countries of the European South that experiencing seismic activity) and encourage relationships between stakeholders of both formal and informal education by establishing a network of schools that will study real data, do real analysis of real seismic activity in real time and will present their results to their communities.

Pedagogic aspects

"Schools Study Earthquakes" engages students in employing real-problem solving skills, handling and studying situations, and participating in meaningful and motivating science inquiry activities. The RRI component of "Schools Study Earthquakes" engages lies in the fact that students deal with real seismic data that they have acquired themselves while they have to communicate their findings to the local communities. In countries like Greece, Italy and Bulgaria the phenomenon is rather common. Surveys in the field demonstrate that the general public is not well informed on the necessary measures that have to be applied to minimize the impact of the natural phenomenon. A complicated geophysical phenomenon like the earthquake is possible

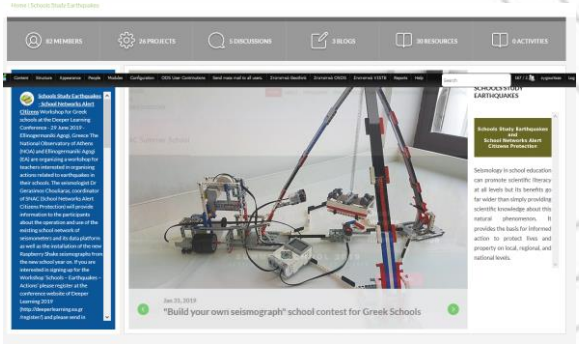
to be studied in the classroom with the use of a simple instrument and results can be obtained with the combination of data from the collaborating schools. The aim of the activity is to create a network of schools that are be active in citizen seismology.

S.W.O.T.

Students have the support and feedback of a wide range of stakeholders. Students for example are in continuous contact with some stakeholders, such as experts, with whom they meet with the objective of sharing the responsibility of designing their actions but also their findings.

Different stakeholders participate throughout the project in order to enrich the results obtained in their development. In addition, students are in contact with other participants, creating a network to exchange content around seismology. Students contact families and members of the societies (to know and understand their stance towards the different issues of earthquakes) but also experts (to understand the more scientific details of these natural phenomena).Students understand how to manage real data and are able to know the importance of working and experimenting with this type of information, reflecting on the need to provide full mechanisms for scientific research.

While working with real earthquake data, students value the integrity of these data and the importance of being responsible for its use, as well as for the conclusions and results extracted. Society is not aware of the reality of earthquakes in their environment, so "Schools Study Earthquakes" plays a very important role in disseminating intermediate results and conclusions to the public. Students are able to elaborate these materials and share them openly, and completely free of charge, to all those sectors that may be interested (such as neighbors and families).



Which aspects are transferable?

The dedicated online community: *https://portal.opendiscoveryspace.eu/en/community/schools-study-earthquakes-849203* is an open and free environment where teachers, students and other interested stakeholders can find resources and exchange ideas.

A class building their own seismograph

Ellinogermaniki Agogi and the Geodynamic Institute of the National Observatory of Athens, with the support of the Institute of

Educational Policy, organized the school contest "Build Your Own Seismograph" for students in Greek schools, in the framework of the "Open School for Open Societies" and "School Networks Alert Citizens Protection" projects. Groups of students, in collaboration with their teachers, have built an improvised seismograph and recorded the process in a presentation accompanied by audiovisual material. The ten projects that have stand out are presented by their respective school teams at a special event held in the framework of the Athens Science Festival on Friday 5th of April at Technopolis in Athens at 10.00. 44 schools for all over Greece participated in the contest that took place for the third year.

A hazzard challenge turned into a learning moment

"Schools Study Earthquakes"adresses the challenge of the study of a physical phenomenon with great societal impact and proposes pedagogical practices based on inquiry-based methods that are more effective in science education. The objective of this combination is on one hand to increase children's and student's interest in science, on how science is made and how it affects everyday life, and on the other to stimulate teacher motivation on up-taking innovative teaching methods, subjects and practices to enrich and renew the science curriculum.

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WHITE STORK PROJECT

Hanna Penkalla

Counting the stork

The VII National White Stork Census took place in 2014. In the Masovian Voivodeship, the census was coordinated by the Wildlife Society "Stork" (Towarzystwo Przyrodnicze „Bocian") as a part of their ongoing "White stork" program which focuses on storks' nests protection, scientific data collection and educational activities.

The census initiative was open for anyone willing to participate in it – regardless of the experience or knowledge in the field. Volunteers tasks consisted of species

monitoring (conducted by each participant in one or various municipalities of the Masovian Voivodeship during the period of 1.07 – 20.07.2014), documentation of the observation results and their publication (results were shared with the representatives of the Wildlife Society and published on-line).

The method allowed to count white stork population of the whole Masovian Voivodeship area – 35 598 km2 – an impressive surface covering 11,38% of Poland.

The role of volunteers

Connecting science and society was possible through involvement of volunteers – individual participants collecting data for scientific purposes – and scientists who transferred their knowledge and gave instructions regarding stork population monitoring. The data that volunteers provided was analyzed by experts. In that way, both parties contributed and cooperated for the common goal.

Thanks to the method used, citizens were directly involved in the process of creating new knowledge regarding the white stork habitat.

The idea of involving volunteers contributes to promotion of wildlife protection amongst citizens and supports the active, engaged attitude.

Methodological aspects

Volunteers could join the initiative by submitting an on-line declaration. The data collected by participants included: location of nesting spots, number of young storks, reasons of breeding losses, cases of death amongst storks, etc. Such a complex data has a great value for the scientific communities.

The scientists' role was to support the volunteers when needed (the communication took place on-line), analyze all the data collected in order to use it in further actions such as populations monitoring and creating solutions for the species protection.

At the end of the observation period, participants were asked to submit the information in a national wildlife register – Polska Kartoteka Przyrodnicza. They also sent the filled in documents (observation cards, maps) to the Society address.

S.W.O.T.

Strength

- Method of stork monitoring itself is not complicated and does not require specific equipment (only field glasses and camera);
- All the documents needed could have been downloaded from the website; the results were also transmitted on-line;
- White Stork census is an initiative of a great importance as it is an endangered species, not only in Poland but in all the European Union;

Weakness

- Monitoring was a time-consuming activity that was conducted during almost 3 weeks;
- Covering big areas requires a significant number of volunteers able to be in charge of specific locations;
- Volunteers have to relocate and travel around municipality (or a couple of municipalities);

Opportunities

- White stork is a very popular species in Poland, considered one of the symbols of the country;

Threats

- Organization of census in July might lead to difficulties with finding a sufficient number of volunteers (summer vacation period).

Which aspects are transferable?

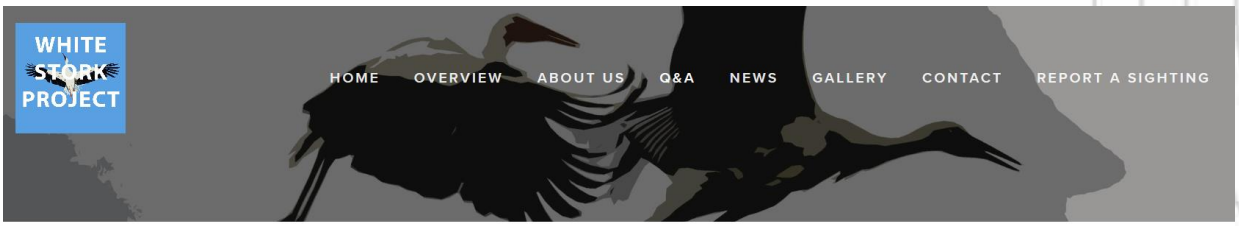
The method was used in the regional context but it could be applied on a larger scale as well, especially since the materials were accessible on-line and the communication between parties involved also took place in the virtual space.

The method can be implemented by institutions and organizations from the field of biodiversity and wildlife protection; it can also be used in any type of fieldwork monitoring/research initiatives where no specialized tools nor specific preparation are needed.

A new connection to wildlife

The white stork census coordinated in the Masovian Voivodeship by the Wildlife Society

"Stork" was a very successful initiative that received a lot of attention from the medias. It is partially due to the fact that white stork is an animal particularly important in Poland and with a remarkably large presence in the Polish culture and tradition. However, more factors contributed to the project success: comprehensibility of the method, lack of restrictions regarding the participants profile (for example no age restriction for volunteers) and its digitalization (on-line application and results submission as well as the on-line accessibility of all the materials needed).



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ADOPT THE RIVER

Hanna Penkalla

Citizen adapt their local rivers

The program was created by the Ecological and Cultural Association — Club GAIA (Stowarzyszenie Ekologiczno-Kulturalne Klub Gaja) in Poland, with the main goal of encouraging citizens to take greater care of rivers and other water bodies in their surroundings.

The program, launched in 2005 is an on-going initiative that assembles different activities – amongst them, the "river adoption" (which is a symbolic gesture of becoming a protector of a specific area) - undertaken each year for the occasion of the World Water Day (22.03). Anyone can get involved in the program – individual participants, educational institutions, local governments, NGO's or any other organizations and institutions. Interested parties declare their willingness to participate – by submitting an on-line petition – and decide by themselves which

activities they want to undertake. The program encourages to take actions in favor of improving the water bodies' condition, to conduct observations and studies on the water quality, to explore the aquatic fauna and flora and clean the water surroundings and it promotes the daily water conservation. The results of actions can be posted online and placed on an interactive map of Poland on a website designed especially for program's purposes.

Since its creation, in total, around 200 000 people have participated in the Adopt the river program. Thanks to the citizens' involvement, 772 rivers and other water bodies have already been adopted. Along with various citizens initiatives, hundreds of lectures have been conducted amongst children, teenagers and adults in order to spread the knowledge and good practices.

Local science around a local asset

Lectures, workshops, conferences which constitute a crucial part of the program foster the dialogue between representatives of the scientific world and citizens.

The results of observations and studies conducted by citizens can be easily shared online – this way, the participants have a direct impact on knowledge creation process.

Thanks to the open formula of the program – type of action taken and way of implementing it depend solely on participants – it gives citizens the opportunity to express themselves and to get involved in an active way.

Methodological aspects

The „river adoption" initiative is traditionally organized on a specific date (during the World Water Day) but other activities can take place all year round. Activities include workshops and educational events, water observations, artistic performances or art contests – the possibilities are endless as they can only be limited by creativity and imagination of participants.

All information collected by those involved in the program is posted on the interactive map of Poland where participants can mark:

1. Places where activities related to the program have been undertaken;
2. Results of the water analysis conducted in different locations;
3. Places where the "BIG JUMP" initiative (yearly initiative conducted in Europe bringing awareness to the

problem of clean water) has been organized;

4. Rivers chosen in the contest "River of the year" organized by the Gaia Club.

Each year, the Association publish on their website also a summary of actions undertaken during each edition of the program and their results.

S.W.O.T.

Strength

- Program's open formula: no limits regarding age, number of participants, location, etc.;
- Assembles a big variety of activities;

Weakness

- Space restriction: many initiatives undertaken under the program require proximity of a river or another water body;

Opportunities

- Subject of the program – water protection, water observation, etc. – fits into the schools curricula which can encourage schools to get involved (participation can become a part of the course program);
- Growing interest for activities related to ecology, sustainability;
- Water as a crucial resource which protection becomes a topic of critical importance;

Threats

- Weather conditions related risk – since a large number of activities take place outdoor.

Which aspects are transferable?

The method that is used in the program can be used by other institutions and organizations that conduct large scale studies and observations on natural phenomena. The interactive map allowing users to share collected data directly is an excellent tool for different types of scientific research.

Gaining knowledge, improving the environment

The program led to initiatives that helped to solve some local problems related to the

state of rivers and find solutions to issues of water management. Several interventions and citizen counseling actions have been organized.

Activities done by participants have a direct positive impact on the quality of water bodies and rivers in Poland.

Bottom-up water protection

"Adopt the river" program tackles on a crucial topic of water and its protection. It is engaging thanks to its accessibility and diversity of initiatives it supports which vary from educational, scientific, artistic, etc. It encourages a creative approach, for example by organizing a contest for "the most creative action". Program uses the interactive map that allows all participants to let others know about the action that they organized or about the results of research they conducted. The opportunity to present one's results on a public platform can be both a good motivation to get involved and a source of inspiration for more activities.

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ROLAND MAZE PROJECT

Hanna Penkalla

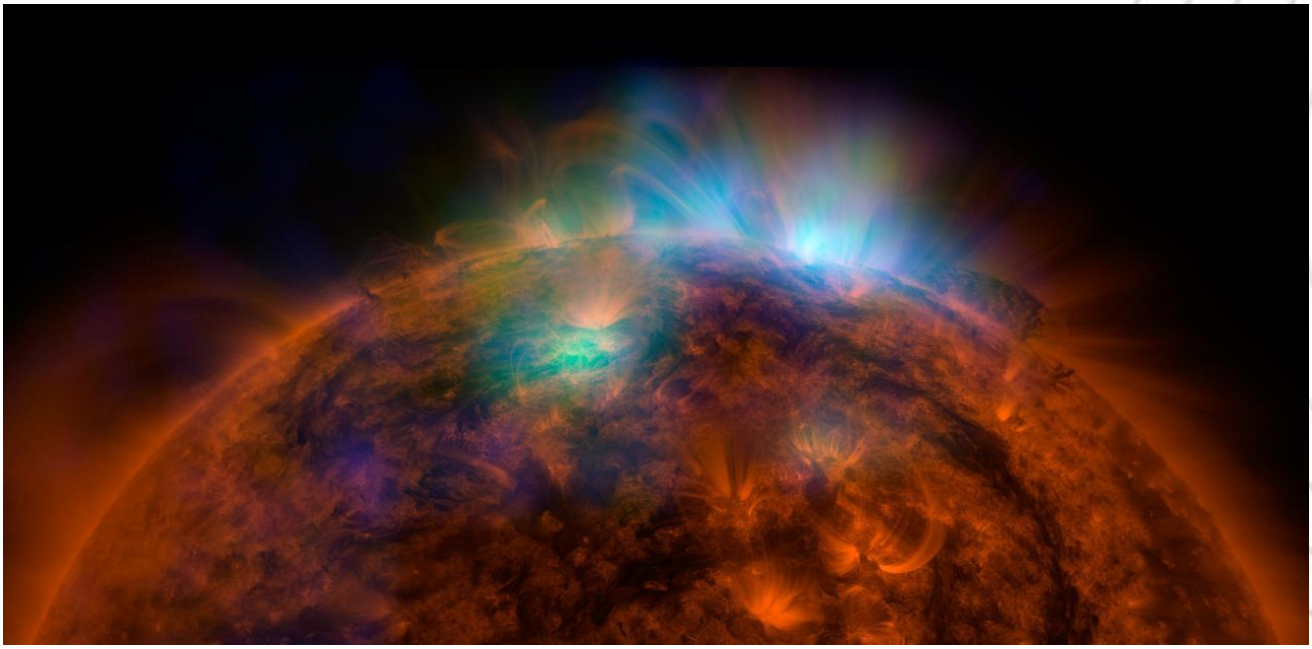

Figure 1 Cosmic Ray © **NASA** www.nasa.gov

Citizens observing the Cosmos

The Roland Maze project was coordinated by The Andrzej Soltan Institute for Nuclear Studies and the National Centre for Nuclear Research - Astrophysics Division, Cosmic Ray Laboratory in Lodz, Poland. The project, launched in 2004, also involved more than 30 high schools in Lodz.

The Roland Maze project focus was the observation and investigation of cosmic radiation made possible by placing the radiation detectors on the roofs of high school buildings.

Citizen collecting data

The project had an important scientific and educational impact and enabled direct cooperation between scientists and high school students. It allowed scientists to gather data on the intensity of cosmic radiation while giving high school students an opportunity to develop skills and gain knowledge in the areas of physics, computing, electronics.

Thanks to the project the scientists got access to a large surface (roofs of high school buildings) on which the radiation phenomenon could be detected. It made possible registration of big amounts of data (because of the large number of schools involved) that can be investigated, shared and exchanged. Except for purely scientific

benefits, we can also see it as a great opportunity to acquire more „young power" in the field.

The Roland Maze project allowed students to acquire extracurricular knowledge on advanced level and skills that could increase their future employment opportunities. The tasks undertaken by students were diverse and multidisciplinary (IT, programming, electronics - building detectors, data analysis) and involved creativity rather than simple data gathering. Further to the main activity (studies on the cosmic ray), the organizers also conducted meetings for the project participants: students, teachers and researchers. The meetings included results presentations and information exchange but also lectures, seminars, etc.

Methodological aspects

The flux of cosmic radiation particles can be observed through detectors that – in order to ensure obtaining correct results in a reasonable time – must be spread in a large area.

The idea of the Maze project was to place the detection points on the roofs of high schools' buildings.

The students, after being instructed by scientists, were building detectors by themselves, conducted observations and studies on the phenomenon and presented results on-line.

The scientists provided the continuous support to the students and in return got access to large amounts of data collected through cosmic ray detectors.

Data and results were shared between schools using computer network. Information could also be exchanged between arrays placed in different European towns and countries.

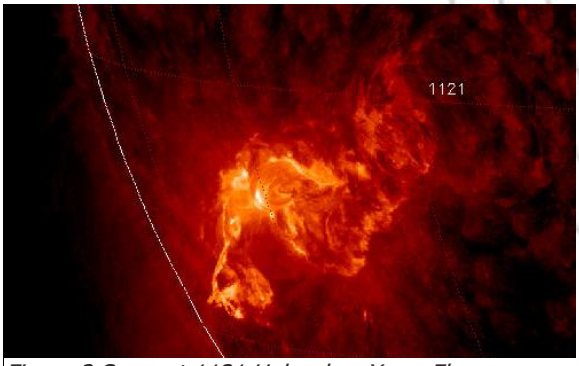

Figure 2 Sunspot 1121 Unleashes X-ray Flare
©NASA www.nasa.gov

S.W.O.T.

Strength

- Ensuring close collaboration between scientists and students;
- Offering a diverse, multi-disciplinary set of activities to participants;

Weakness

- Requiring high level of skills and knowledge regarding physics, computing, electronics among hig school students;
- Project success depends on a number of high schools involved – in

order for the results to be relevant, the area covered must be significant;

Opportunities

- Young people's growing interest in extracurricular activities that can foster development of their professional career;
- Cosmic radiation remains a relevant object of study since it has not been fully understood yet;

Threats

- Project expects a high and continuous involvement of all participants that can be difficult to maintain throughout the whole year and longer (taking into consideration holidays, breaks, etc.).

Which aspects are transferable?

The Roland Maze project was focused on a local area and included schools from one city only; however, it does not constitute a prerequisite for conducting such studies. Studies on cosmic radiation could have a much larger scale and allow cooperation between different cities and even different countries that could be connected through Internet network.

There are significant benefits resulting from involving high schools and students to the project activities– on one hand, it provides with sufficient surfaces to conduct investigation (especially in big cities with large number of high schools); it also gives possibility to cooperate with young people who can conduct research on their own.

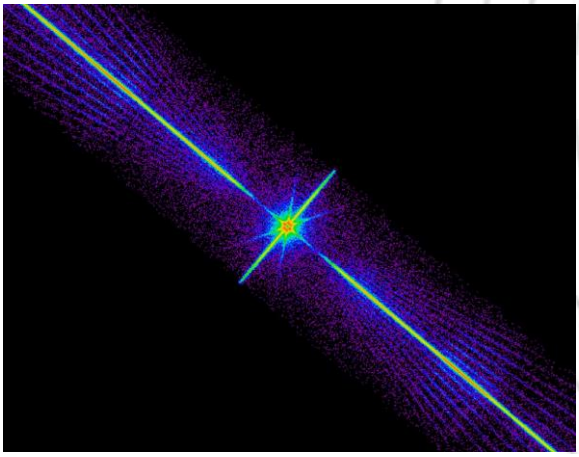

Figure 3 History of Chandra X-Ray Observatory
©NASA www.nasa.gov

Lets explore the cosmos together

Several characteristics of the Roland Maze project permit to classify it as "smart" and "innovative":

- Its great scientific value: project focused on a phenomenon that is still not fully understood;
- Its accessibility: each high school from Lodz could take part in it; it did not require a big financial input (compared with the cost of large detectors) : the cost of one mini array (one school) was around 5.000 EUR;

- Its transferability: it could be conducted also in other cities and countries
- Its multidisciplinary: activities related to the project involved different disciplines – physics/astrophysics and electronics, IT, etc

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Learning experience design

Naked Nomade

Naked Nomade

Naked Nomade means Cellamare sisters: two young girls from Trani (Apulia, south of Italy) who saw in food the extraordinary power of bringing communities together. Following this thread, Anna e Kedy Claudia Cellamare decided to open Cozinha Nomade: a Neighborhood Kitchen where food and participative practices are used as ingredients to create a collective story, a common narrative, a choral tale about the surrounding territory.

"We invite food lovers and people passionate about cooking - a.k.a. Culinary Nomads - to join our social challenge by proposing their own culinary workshop. The project is still in its prototyping phase: an atelier where people are allowed to test their ideas and visions of community, raising model through a bottom-up approach and enhancing diversity."

But Naked Nomade is also Learning experience design: a research approach merging food design – "You don't design a product, you design a way of consuming it", with art – "there is no final result, only a continuous succession of phases" [Kevin Lynch] - and education - "If I listen I forget it, if I see I remember it, if I do I understand it" [Bruno Munari speaking about "learning by doing" approach].

"We believe in the power of experience design approach to create transformative learning experiences and design as a medium to improve citizen's life" claims Anna Cellamare during her presentation in Athens Scie-Citizens project meeting in June 2018.

Learning experience design leverages on the power of human interaction in the learning process. The fact that knowledge enriches only when it's shared.

Design learning experiences means focus on the process - an ongoing process – since what really matters is not the final output: the process produces formations rather than forms. Learning Experience Designers search for unexpected but correlative, emergent patterns transforming the output of the process in the input itself (like for the colours produced in the example below).

Learning with Food

One of the lab designed by Naked Nomade - and experienced by Scie-Citizens consortium partners in Athens - is one of the most funny and interesting experiences "we designed in the last months". The experience synthesizes the concept of creative process and the learning by doing approach.

Food is a very interesting topic, that involves many different aspects of our life: sociology, anthropology. In this case: science and alchemy. Some ingredients and foods indeed, besides the nutritional properties, have other useful powers.

Like the red cabbage: It contains anthocyanin, which belong to a class of molecules called flavonoids. Scientists refer to red cabbage juice, calling it "pH indicator", since its color changes with pH. When anthocyanin comes in contact with another ingredient, they instantly react; hence, we can infer if the pH of the ingredient is acid (pH < 7) or basic/alkaline (pH > 7). The pH of neutral solutions is 7.

How does the reaction occur? The juice changes its color. For example, if this

ingredient is acid, the juice color will turn into fuchsia.

Participants of the experience start to play with cabbage and other ingredients brought by the designers (like eggs, salt, vinegar, etc…), one by one or even mixing them. Each time they're using a small square plastic box, ending up having more than a dozen of them with different colors.

The output of the experience becomes input of a future one, as it generates new ideas. In this case the colors resulting from the workshop will become a potential input for a new activity, based on how to use them.

Learning Chemistry in the kitchen for everyone

This project links society and science because Anna and Kedy were able to explaine chemical and scientific concepts through a workshop. Participants are involved in applying the method in their group.

"We involve participants in applying the method, pushing them into experimentation, discovering and not being afraid to try."

Everyday ingredients like food, fruit and vegetables are used to strength the dialogue between daily life and research and avoid that important topics such science seem to be far from the general interest.

Strength, weakness, opportunities and threats

Strength

It creates a strong link between people and the "learning material".

Weakness

It is not always easy to convey the importance of the learning process more than the product.

Opportunities

It brings citizens closer to important topic, such as science, through the manipulation of different materials and play as a learning tool.

Threats

Difficult to achieve economic sustainability.

Which aspects are transferable?

There are many aspects transferable in different context and with different target

audience. The main one is the core of Learning Experience Design: focus on how participants, as human person, will live the learning process, leaving an open end, giving a lot of space for mistakes, surprise and joy.

Being open end curious from multiple fields such as culture, positive psychology, social design, art is key source for this kind of design approach.

A success story

One day Anna and Kedy were in crisis because they couldn't find the main ingredient of their laboratory in the markets of their city (the red cabbage is not very consumed and widespread in Italy). Thus, they decided to experiment the laboratory with other ingredients (tea, beet). The result was unexpected and excellent!

Final summary: what makes it in your opinion a smart method?

Learning Experience Design is an attempt to become a discipline itself, with own approaches, tools, methodology and evolution. Fostering its application on science contents, will switch the narrative of education from passive and far, to active, collective and joyful.

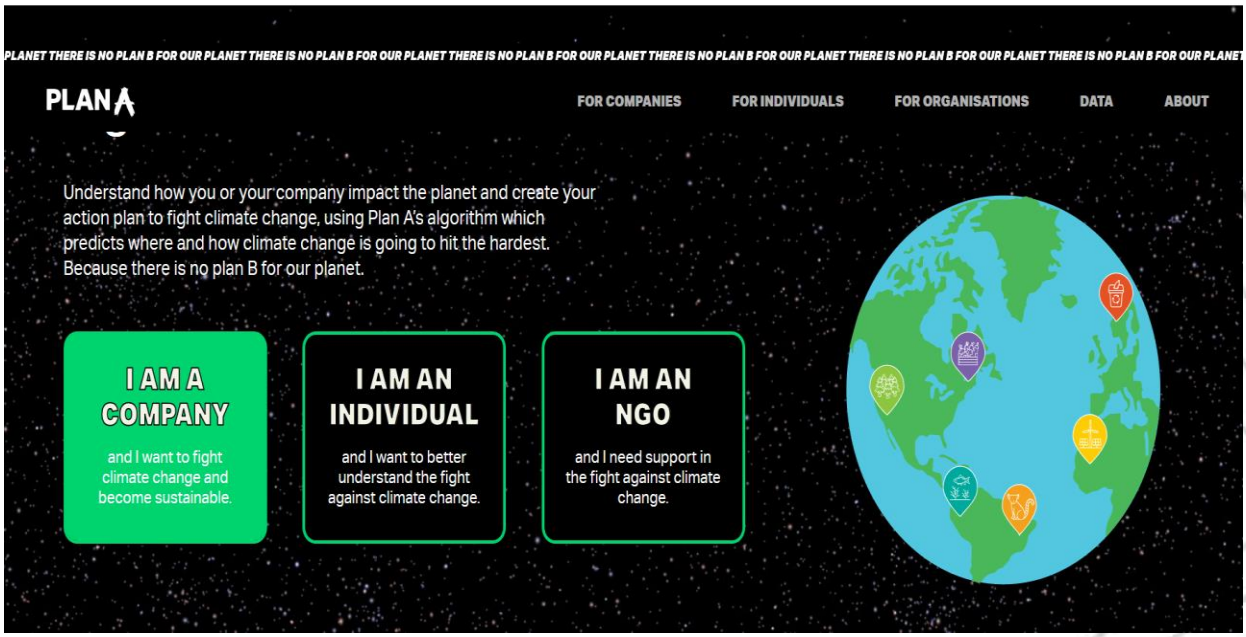
6

SUPPORT OF THE SOCIETY TO UNDERSTAND NEEDS AND FORMULATE CHALLENGES

Funded by the Erasmus+ Programme of the European Union

PlanA.Earth - fighting climate change with data

Lubomila Jordanova



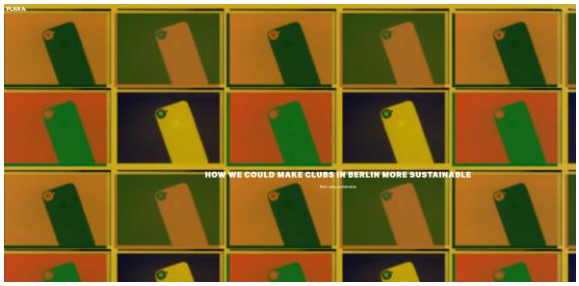
PLAN A a community to fight climat change

Plan A is the first community- and data-driven action platform in the fight against climate change. The company uses publicly available data on Waste Management, Oceans, Forests, Wildlife, Sustainable Living, Sustainable Energy to develop an algorithm to predict where and how climate change will hit the hardest. This technology helps our company communicate to individuals and businesses the biggest environmental threats across the globe and the actions which need to be taken in efforts to become more sustainable.

Teaching with and for citizens, connected to concrete actions

Citizens are now an integral part of the communication cycle. Social media, commenting, live reporting have made individuals personal outlets. Our goal is to create content that makes it easy for citizens to care and share the knowledge. At the heart of our solution is databases and scientific climate indicators. To transform Excel sheets into visual pieces or fascinating

stories (that they are) is an art that infuses science into society, action and policies.

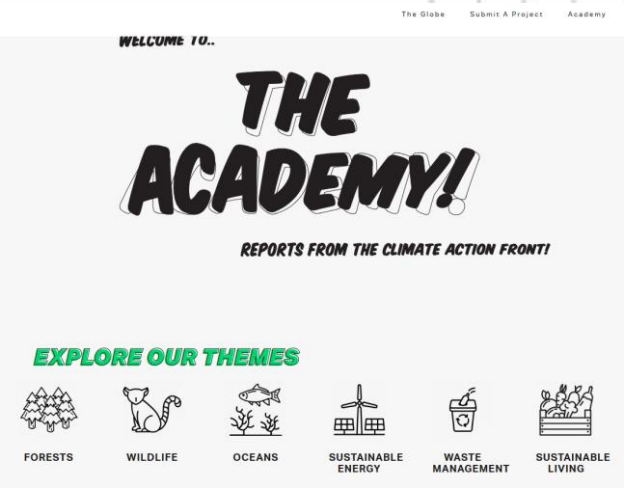


Pedagogic/methodological aspects

We have developed content for a wide variety of online channels, from classic social media to creative videos and infographics. The method starts with data analysis: what do we need to communicate, and why? What informs a current problem such as wildfires in the Summer? How does a particular natural process work? From there, the objective is to make the data tangible (what does 10 Million tonnes of CO2 represent anyway?) and informative. That is achieved by framing specific information into a story. A data point by itself is not very remarkable. A data point within a story that illustrate our most dire point and then opens the door to solutions can become a communication success story.

We have created and tested numerous stories and the one that is consistently leading to most action is the positive narrative. So we spun it off in different formats: infographics, playlists, articles, photos, visuals and videos.

This requires labour from the creative field, but also participation from the public to be the collective megaphone that drives action and controls the narrative of climate change.



Strength, weakness, opportunities and threats

Strength

- Relatable to a wider audience language and visuals
- Accurate and interesting
- Inclusive and collective positive narrative

Weakness

- Outside classic codes of journalism and science
- Very wide topical range

Opportunities

The platform is able to connect large audiences to the issues of climate change using scientific research and help them identify actions which they can take to address climate change as individuals, businesses, organisations.

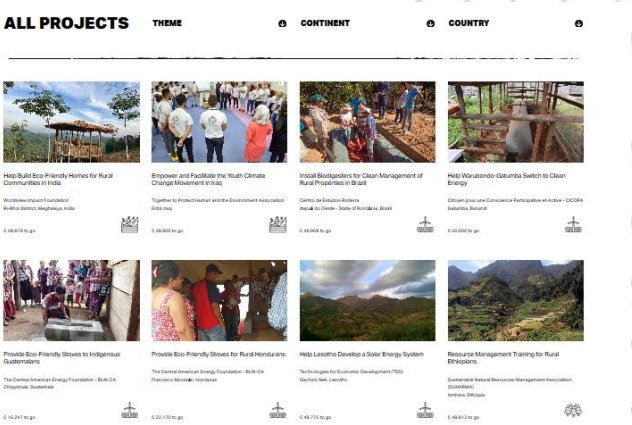
Which aspects are transferable?

- The language style. Climate change does not have to be desolation and catastrophes
- The platform is open and can grow as much as its participants want it
- All publications are usable and transformable
- The science always being connected to actions in real life it should lead to (to address climate change)

A success story

This short story relates to the points defining smart practices. We invited a researcher to one of our events to present the famous, yet mysterious problem of E-waste. This scientist explained in depth the question of heavy metals and urban mining. At the same time, the event was collecting used E-waste to repurpose or properly dispose of. Citizens who attended this free event were also provided with accurate information, context on the issue and invited to ask their questions.

This was a big success for citizens, science and climate change as it combined an action and clarified thoroughly a very complex subject. Each participant went home with less waste and a package of knowledge to diffuse the information around them.



Final summary: what makes it in your opinion a smart method?

Plan A is using an approachable, digestible approach to communicating scientific data related to climate change. The style of the language and website allow for large audiences to feel comfortable with exploring the content and spend time on the platform to learn about the issues and solutions for climate change. The website is modern looking and exciting to spend time on.

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WALKING SURVEY - Spacer badawczy seniorów w Gdyni

Hanna Penkalla

Involving seniors in urban planning

The project was conducted in Gdynia, Poland by Pracownia Badań i Innowacji Społecznych „Stocznia" (The Studio for Social Innovation and Research 'Shipyard') and Klon/Jawor Association.

The starting point for the project was the idea that cities should not be designed by architects only; they should also be influenced by those who live in them. Public spaces should be created accordingly with local needs. In order to adapt the space better to its citizens, the City of Gdynia decided to organize a series of walking surveys with senior habitants during which they would share their perspective, their opinions and suggest some improvements. This interactive technic allows to evaluate the space from the citizen's point of view in a simple, engaging way.

Participatory observation or the reviatlisation of the flaneur

The walking survey method explores the concept of regular citizens being in possession of unique knowledge that is essential for experts – in this particular case for specialists in charge of urban planning. Participants are offered tools allowing them to directly participate in the process of designing the city space regardless of lack of experience in the field. In that way, the project promotes the attitude of involvement and active participation in the city's activities. The organizers engaged young volunteers to guide older adults through the chosen routes creating opportunity for intergenerational communication and knowledge exchange.

Methodological aspects

In total, 6 walks have been organized, leading through 3 different routes. Each walk lasted around 1,5 h and they took place during different times of the day.

2 volunteers/ animators were needed for each walk; in total there were 12 guides involved. Their main role was to ask questions and record participants' answers (by taking pictures of elements discussed and writing down comments). The number of participants invited for each walk was between 2 and 3 people. Overall, 17 seniors took part in the project.

The process itself was divided in 4 stages:

1. Choosing the route and creating the scenario: selecting the area, the issues to be discussed during the walk and choosing particular elements of space that would be the object of investigation.
2. "Trial walk": organizing a trial walk which enabled modifications and corrections of the previously created scenario.
3. The walk: led by volunteers in small groups.
4. Data collection and analysis: Concluding meeting with volunteers which allowed collection of all the information shared during walking survey and creation of a report to be forwarded to the City Authorities.

S.W.O.T.

Strength

- Does not require participants to have a specific knowledge (anyone can participate), requires a minimal financial output;
- Intergenerational cooperation as the added value of the project;

Weakness

- Requires a very good preparation from the volunteers side;
- Implementation of suggested solutions by the Authorities can be a very time-consuming process (which could be discouraging for participants);

Opportunities

- Growing interest for initiatives addressed to older adults;
- The project fits within the City strategy of creating inclusive space, well adapted to citizens' needs;

Threats

- Outdoor walks depend on weather conditions which can be changeable;

Which aspects are transferable?

The method of walking survey is easily transferable and can be used in different contexts; both outdoors or inside buildings. It can involve different focus groups (various age groups, people with disabilities, etc.). It can also have different objectives – for example, contrarily to the walking survey conducted in Gdynia where the walk route has been chosen by organizers (in order to discuss particular elements of city landscape), the walking survey can lead

through a route chosen by participants themselves to let the organizers discover which places are the most popular or convenient for citizens.

Intergenerational particpation in matters of everyday life

The walking survey project offers simple and practical solutions to issues related to urbanization processes. It reminds us that cities should adapt to its habitants and their needs - not the other way around . Allowing citizens to reclaim the space that belongs to them by giving them tools to shape the city landscape can lead not only to visual changes (in the city appearance) but also to social changes through assuring citizens that their opinion matters and that they can have an important impact on their environment

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The third language: art

Kilowatt

Kilowatt, Resilienze Festival

Kilowatt is a coworking space and an accelerator of ideas with a high social, cultural and environmental value.

Kilowatt renovated an abandoned public space - Le Serre dei Giardini Margherita - in Bologna, Italy, conceiving urban regeneration as an opportunity for social innovation, community organizing and social cohesion.

Kilowatt promoted together with other partners different projects connected with communities, enabling them to codesign (build hypothesis) and live (validate them empirically) a positive imaginary. This approach bring communities to overcome the dystopian and frightening imaginaries, make collective and community-based choices, instead of an individualist ones, desire generating a better future and a cohesive society.

One of these project is Resilienza Festival an annual festival at it 3rd edition, where to reflect on the themes of sustainability, climate change through art, to imagine a new approach to the great planetary transformations.

Credits: Lorenzo Burlando for Kilowatt

Bringing back science and facts through Pop-Culture

In a time of crisis, mystifications and obscurantism, where science-based facts are denied even in front of empirical proofs, Kilowatt decide to leverage on a more pop medium in order to spread awareness on both ethical, ecological and social urgencies and concrete and rooted solutions.

Art is the medium that translate knowledge in experiences and relations, enabling citizens to live and understand that knowledge. In Resilienze Festival, as in other projects promoted by Kilowatt, citizens are not asked to speak the language of scientists, and nether scientists to speak the language of citizens, but artists are the ones called to build bridges between the two languages.

These bridges are the starting points to propose a concept of sustainability in system key, placing individuals at the centre of a system of network of connections, enhancing their relationships and power that interactions can create. It is the acceptance of the complexity, in its most positive sense, which calls for a new idea of development that has to be rooted and radical.

Rooted like all those who decide to get involved with choices of change, focusing on their own territory and its protection, with a view to the impacts of the to act at all.

Radicals like the many who feel the urgency to address reality with absolute determinations, intransigent towards any reductionist vision that does not include the world as a complex system to be preserved for the peoples of the Land of today and tomorrow. Choices that are not afraid to imagine a different way of living, thinking, relating, to feed, to create.

Art as science narrative

Resilienze uses the languages of art as tools for a fluid, interdisciplinary, intriguing and inclusive narrative. Four formats characterize the event:

Stories. Dialogue, exchange, discussion, listening: power to the force of confrontation for a series of meetings, talks, book presentations to explore the themes of the

festival. The word as a radical tool to give life to new communities of dialogue.

Perceptions. Art questions big changes, and does so through site-specific installations, writing, music, and theater. A multisensory exploration through the works of artists who are facing the themes of climate change, resources and the environment.

Experimentation. Ancient knowledge and new technologies to play and get involved, in an attempt to become the first generators of change. An invitation to take a stand through interaction and discussion, thanks to the work of artists, activists and free minds.

Glances. The cinema and photography to tell stories that impose themselves in their urgency: lenses focused on realities that require to be told. Root and radical stories of territories and exceptional people, stories of disasters and human follies, of change and possible futures.

S.W.O.T.

Strength

It creates a deep connection between citizens and science, using unusual languages typical of art.

Weakness

The experience and sensibility and capability of understanding science of the artist, plus her way of translating it for the public, is crucial for the achievement of the goal, and not so obvious to achieve.

Opportunities

There is a convergence of interests both for scientists than artists.

Threats

Lack of awareness, for both scientists and artists, of this convergence of interests.

Transfer: Involve artists

Call an artist. Ask her to listen and deeply understand what scientists are working on. Support a dialogue until she will find the way to build a positive experience out of scientist work. Give her a place and time where citizens will have opportunity to experience and build dialogues around that artistic creation.

Shooting Stars

"Shooting Stars" is a sound installation capable of shaping shooting stars, created in collaboration with the National Institute of Astrophysics-Radiotelescope of Medicine (Bo).

Thanks to a constant live streaming connection, live from the Center for Astronomical Research, Shooting Stars allows participants to listen to the sound of shooting stars at any time of day, any day.

It becomes real the opportunity to listen to the noises of the cosmos and express a wish when we hear this sudden and unreal sound, which reminds us however that it is always the right time to dream.

Final summary: what makes it in your opinion a smart method?

This smart practice bring us to think about the possibility of adding a third actor in the relationship between science and citizens. It's simple but effective way to make citizens understand the impact of science on own lives, especially during these times of uncertain and constant rapid changes. It's simple but effective also in making science even more transdisciplinary than it is - sometimes – today, adding a new dimension to their work: the artistic one.

Credits: Lorenzo Burlando for Kilowatt

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Courses based on STEM education

Loredana Staicu

Code School for STEM

The Code School it's a private technology club whose purpose is to bring children aged between 7 and 14 years closer by the IT field and the STEM Education (STEM = Science, Technology, Engineering and Mathematics).

Starting from June 2018, we aim to give children the chance to discover their passion in IT field, following an interactive program.

The activities that we provide - are divided into 3 categories:

- Programming;

- Computer usage

- Ethics, responsibility and online security.

Robotics is a fascinating and entertaining way of teaching mathematics, computer science or technology. Using robots, kids become creative and train their critical thinking to solve real world problems.

The kids are now more motivated to use the computer in innovating and learn in this way - useful information for their future. We also encourage team working improving the relationships between our students.

Teaching Children on Computers – helping them to code programs

We teach kids about computer science (developing applications in various programming languages and platforms (Code Studio, Scratch, Code, Blocks etc.), robots programming using Arduino).

In this best practice we present the involvement of children through science and education, teaching how to develop their analytic thinking – in this way, later, they will be capable to develop their community.

The students and their parents can tell us what are the formation needs regarding the programming language and platform to learn about and the application to develop. Then, we try to create the personalized program that fits each student.

The kids are welcome to express their own ideas regarding the information they received.

We try to develop new applications. For example, we program robots to do various tasks (to blink, to turn around, to avoid obstacles etc.)

Methodological aspects

The process of learning is top - down and co-creative. We have personalized training courses based on STEM education. The teacher explains to the kids the main terms and, once the information is well understood, they can develop their own applications. We can see results after 4 sessions.

The resources are easy to be accessed because they are online.

The trainer doesn't need IT knowledge, he can be trained by one of the existing trainers and the lessons content it's easy to understand being explained in a very comprehensive way.

S.W.O.T.

Strength

Fairly easy to implement, training can go on for many years without a specific endpoint.

Weakness

A limited number of an appropriate timeframe for classes (we are limited to weekends: morning and noon).

Opportunities

Can be easily combined with any other activity involving kids learning and playing. Can also be combined with adult education.

Threats

A similar method provided by a global company either free or at a very low price.

Opening Children for STEM lessons

A child had been presented by his parents as being not very sociable and easy to get bored is attending classes with enthusiasm. He is participating with more and more ideas, proof that science can help us find a common language.

Learning how to make technology

We use multiple STEM resources in order to make new discoveries.

The coding courses are meant to teach children how to create technology, not just to use it.

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Open Schools for Open Societies

Stephanos Cherouvis

Schools as hubs of responsible science & innovation

The Open Schools for Open Societies (OSOS) initiative aims to facilitate the transformation of schools into open, innovative and democratic ecosystems, acting as shared hubs of science learning and knowledge transfer and using as vehicles student-lead STEAM projects that address local and/or world challenges with an emphasis on social responsibility and change. OSOS is working with a network of 1000 schools, 2000 teachers and 10000 students across Europe and beyond. OSOS offers an array of community building, content co-creation and delivery and self-reflection tools to students, teachers and school leaders, as well as a set of designated science best practices, the OSOS Accelerators, that can be used and adapted for the purposes of student-lead school science projects focusing on local needs.

Students as citizen scientists

OSOS aims to support schools in establishing effective collaboration with external stakeholders towards the development of a European Network of schools, science centers, museums, industries and local communities OSOS, connecting teachers across schools and external organizations,

within and across national boundaries and having them engage in an ongoing exchange of experiences across school, regions and countries and focusing on STEAM RRI student projects. In this context, students are treated as citizen scientists who are investigating solutions to local challenges in their classrooms and beyond.

How OSOS works

OSOS follows a four-step process in guiding students to develop their citizen science projects:

Feel: Students identify problems in their local communities. They can also select topics related to global challenges. Students observe problems and try to engage with those who are affected, discuss their thoughts in groups, and make a plan of action, based on scientific evidence.

Imagine: Students envision and develop creative solutions that can be replicated easily, reach the maximum number of people, generate long-lasting change, and make a quick impact. They are coming in contact with external actors, they are looking for data to support their ideas and they are proposing a series of solutions.

Create: Students are implementing the project (taking into account the RRI related issues) and they are interacting with external stakeholders to communicate their findings.

Share: Students share their stories with other schools in the community and local media.

S.W.O.T.

Strength

OSOS offers a clear and step-by-step outline of how a school can embark on the process of opening up to its local community, through the use of RRI-enriched student-projects that address local issues and propose solutions that have been studied with the support of stakeholders such as universities, science centres, museums and businesses.

OSOS views the innovation process as a "chain reaction":

- We need to "**increase the mass**" of the innovators,
- We need to bring them together to exchange ideas and experiences (**increase density**),
- We need to motivate them by providing them with tools according to their educational needs (**increase temperature**),
- We need to reflect on their practices and provide guidance for future actions (**increase reflection**)

Imagine a straightforward scenario in which students are researching a local environmental issue by conducting basic

research in the classroom, at home and in the local community. In this process, students, under the guidance of their teachers and with the use of the appropriate OSOS digital tools, are informing or even training their immediate community on ideas, solutions, real data, etc., enriching therefore the image of science and its role in collective well-being and democracy

Weakness

The OSOS approach relies heavily on what we call the teacher/school leader as an Agent of Change. It is of crucial importance therefore for such an approach to locate these actors and support them in embarking on a trip towards opening up their school. This requires a constant community and capacity building and network support in way that excites teacher without overloading them with activities.

Opportunities

OSOS offers a fantastic opportunity through its Open Schooling Roadmap to schools and policy makers to implement a pathway towards openness. The Roadmap proposes a concrete overview of the implementation of open schooling approaches, offering a clear description of the necessary steps that schools will need to take in order to become hubs of responsible innovation and citizen science that bring together as many stakeholders as possible with an aim to produce ideas and solutions that address local issues and challenges. Applying the OSOS approach in local settings will make it clear that schools have much to gain by fostering connections between formal and informal learning, between existing providers of education and new entrants.

Threats

As with all innovative approaches in education and elsewhere, resistance to change is a major issue. In particular, educational systems have been for decades promoting a model that allowed little room for autonomy. In this context, attempts that challenge a strict curriculum-based approach may find it rather difficult to penetrate school structures. OSOS provides a set of actions that address the issue in its Open Schooling Roadmap.

Which aspects are transferable?

The OSOS approach to openness offers a clear and highly transferable pathway for schools to adopt an innovative methodology with an emphasis in citizen science and using student-lead RRI enriched STEAM projects. Aside from schools, the approach could be easily adopted by other organisations, such as NGOs, local bodies, charities, etc. with an interest in projects that address local and/or world challenges and in stakeholder community engagement.

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An OSOS success story

An OSOS School Hub, Dunboyne Senior Primary School "Junior Pollinator" project has won the National Award for excellence in global awareness and best newcomer award nationally at the Irish Aid Awards ceremony. The National Final took place in the Printworks, Dublin Castle, on June 11. Minister of State for the Diaspora and International Development, Ciarán Cannon, presented each of the Finalist schools with a trophy for their outstanding achievement in this year's Awards. The Irish Aid Awards is an annual awards programme for Irish pupils from third to sixth class. Pupils work in pairs, as a class or as a whole school to present a project, exploring the United Nations Sustainable Development Goals and the work of Irish Aid. The Irish Aid Awards help Irish pupils to understand the links between their lives and the lives of children and their families in developing countries Taking part in the Awards gives primary school pupils a wonderful opportunity to explore development topics and the work of Irish Aid. This was the fourteenth year of the Awards and this year's theme is "Leave No One Behind", which asks teachers and pupils nationwide to think about how they can transform the world through the UN Global Goals for Sustainable Development. The Awards enable Irish pupils aged 8-13 to become aware of the United Nations Sustainable Development Goals, and Ireland's contribution through Irish Aid to the achievement of the Goals.

Why OSOS?

Placing the work produced by the students at the heart of an open educational approach to both science teaching and learning and citizen science in the form of Responsible Research & Innovation (RRI) offers a unique opportunity to schools to prepare and support today's students in becoming tomorrow's responsible citizens with an understanding of the role of scientific knowledge and their relationship to it. In addition, the fact that such an experiment addresses an audience of over 1000 teachers, 10000 students and 1000 schools, having also developed an array of supporting schools and over 700 project accelerators, makes it a leading initiative in the field.

Funded by the
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of the European Union

Training courses for socio-educational animators - AGLT

Maria Claudia Prutieanu

Social Educational Animation

Asociația Grupurilor Locale de Tineret - AGLT was created on a Flemish-Romanian project by people who felt the need of new and interesting ways for children to spend their free time.

AGLT is a non-governmental organisation that has as main activity socio-educational animation. We started building our organisation since 2000 and in 2004 we were legally a NGO. AGLT is the umbrella organisation for over 30 local groups (GLT-Youth Local Group) all over Romania. Each local group organise different activities for its community.

We organise play days for children, youth exchanges, trainings, cultural activities, prevention campaigns, non-formal education.

Every year we organise camps with courses for our volunteers in which they learn how to be organise play days, how to communicate efficiently and how to develop and improve themselves.

In these camps, we have four courses: beginner, advanced, training of trainers and special needs animation.

Since 2013, we began working with Thomas More University in Belgium, in order for the students of University in Belgium to make their internships in Romania. Over the years, about 10 Belgian students had the opportunity to make their internship in Romania in social studies.

At the end of 2016, we hosted Dennis Bullen, intern through Erasmus+ Program, from Thomas More University in Belgium. Thus, in the 4 months, Dennis worked at Local Youth Group 'ARCUS' Reșita and was guided by Alina Bosânceanu (AGLT volunteer) during the whole internship. Dennis wanted to learn more about the social assistance services in our country, about working with young people and particularly disadvantaged persons of our society.

He has worked with children and adults with disabilities at Maria and Primăvara centres, developing activities suitable for the period before Christmas. Therefore, the experience gained from the internship spent in Romania, it has helped him to balance the knowledge he had and acquired during this period.

Empowering Youth with science

"Social inclusion" is an interdisciplinary intensive programme. This programme was designed for Social Work, Nursing and Midwifery - students and focuses on the social and healthcare system in Romania.

From a citizen initiative (2 friend working in youth sector Bart Wynants from Belgium and Doru Pruteanu from Romania that establish AGLT as a youth national organization in Romania with deep connection to Belgium youth organizations) to a new generation of social workers, universities exchanges, researcher programmes - to science!

We have chosen 'active learning' as a method.

For the camp, education experts help every year on writing the appliance and on performing the training courses. The project uses educational science as the base for the training courses. Our training courses are

designed for the society, for our target groups of people and are continuously updated based on the needs of the society. We also use this project to be able to work with the gap between generations and to respond to the need of permanent education, for the fact that youngsters work with adults side to side in their activities.

Learning Environment not just for young people

This is a strong learning environment where young people work in a group finding solutions for challenges. Collaboration improves inter-professional thinking and acting! Active learning relies on the capacities to cope with the situation of the group dynamics; it assumes a working culture and willingness to actively contribute to the success of the programme from each individual student.

The social workers and nurses form a new entity in order to undertake an activity together. This collaboration is a basis for creating innovative activities or/and for developing new services.

To apply for funding to implement the method you need 2-4 experts to write the application and 25 trainers in the national camp that are meant to teach the youngsters (AGLT volunteers) how to be able to organise play days with the children from their community. Trainers teach those methods, games, tips & tricks. We can see results after 1 month of training and we measure them by:

- Number of socio-educational animation activities
- Number of volunteers attending the camp every year
- Number of children that come to our activities.

Every year after the camp, between 80 and 100 of new animators go back to their communities and they organise at least 30 play days each year. At these activities participate a number of 500 children in a month.

S.W.O.T.

Strength

- The project brought together Romanian and Belgian youngsters for the same aim.

- Working with youngsters it is a strength because they are the strongest assets of a community.
- Our activities have a huge number of beneficiaries.
- AGLT is at this moment in Romania the single organization that delivers courses for animators working with children and youngsters with disabilities.

Weakness

- We depend on the number of kids and youngsters willing to participate in our projects.

Opportunities

- Developing the next generation of SMART citizens/adults by educating the youngsters in a non-formal way.

Threats

- A legislative change in Romanian methodology regarding youth projects which won't allow us to organise the courses.

Which aspects are transferable?

Other organisations and institutions can take our ideas of the camp and internship model and adapt them to respond to their needs. This model can be used in non-governmental sector, but can be adapted for private and science sector as well.

Researcher as builders

The base of the organisation was built by citizens on a Flemish-Romanian partnership and a nice thing is that an important research project from 2017 between two universities was built also on a Flemish-Romanian partnership by an AGLT trainer.

A citizens driven smart method

The initiative came from the citizens. They saw the children needs and they develop an interesting and innovative way of spending children spare time - learning new things and getting to know other people outside school.

Considering that children these days are attracted more and more by spending their free time inside with a smartphone/pc, we are offering them an alternative.

The youngsters find in their group of volunteers a place where they can express themselves and increase their self-esteem,

in this way practicing for when they will become adults in their community.

We trained youngsters for becoming socio-educational animators which are meant to organise play days with the children from their community. Among this, they are also trained to adapt on every situation they might be put on and to grow as being responsible adults.

Participant always learn how to adapt and use brainstorming on creating new games, new methods and are always encouraged to be creative.

The play days organised in the communities have a huge impact in society and year by year are organised more and more.

Funded by the
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PAHRCA - Vulnerable citizens as co-researchers on social policies in Europe

Cristina Cherț

RE-InVEST

This method was developed within 'Rebuilding an Inclusive, Value-based Europe of Solidarity and Trust through Social Investments' - RE-InVEST project.

Re-InVEST project involved 19 organisations (13 universities and 6 NGO's - universities, research centres and civil society organisations working with vulnerable groups). The Open Network for Community Development Foundation (Romania) was one or the partner NGOs in the project representing Romania. The ambition of the Re-InVEST project (2015-2019) was to contribute to strengthening the philosophical as well as the institutional and empirical underpinnings of the SIP – European Pillar of Social Rights – with a view to fostering a more inclusive Europe.

It draws on capability and human rights based participatory approaches to enable the voice of the vulnerable express how the EU Social Investment Package can be strengthened.

Our collective studies critically investigated the impact of the financial crisis on vulnerable groups, their experiences of labour market and social protection and their experiences of social investment or disinvestment in social services as well as the marketization of that social investment.

"Merging of Knowledge"- Citizen science aspects

The "Merging of Knowledge" approach understands knowledge as constructed from three parts: scientific knowledge of academic researchers; experiential knowledge of the vulnerable; knowledge of those who work among and with the vulnerable.

The method is an empowerment tool for the participating citizens

Each NGO or each institution can use it for a real assessment regarding a need and the possibility of resolving the situation

This method was build-up into the project time. It is a co-working method between Researchers, vulnerable people and NGO representatives. It's not the method of someone or somebody…it's a method of the project made by all 19 institutional partners, by all community participants involved in qualitative case studies and by all NGOs that even if they were not partners, they were asked by the Universities to facilitate the dialog.

RE-InVEST
REBUILDING AN INCLUSIVE, VALUE-BASED EUROPE OF SOLIDARITY AND TRUST THROUGH SOCIAL INVESTMENTS

Methodological aspects

For implementing this method we need at least 2 researchers to have a better view of the analyse because we need a qualitative study into a quantitative research. Moreover, we need the link between the vulnerable groups and the researchers - the NGOs people that build the trust between the 2 parts.

We need at least 20 participants for a real group of discussions (parts of the vulnerable group). With 20 different persons participation we can develop a qualitative research because each of them is bringing a different perspective (personal and institutional) over a decided before topic.

For the first result, we need 3 months when the group into the research do not know each other and do not know the researchers; 1 month if the group are beneficiaries of the NGOs or they know each other from different activities, actions, projects.

S.W.O.T.

Strength

The realised dialog between all parts involved (very hard to realize because of the different used vocabulary: big difference between academic and citizens vocabulary used).

Weakness

We need 'social translators' - NGOs representatives that understand the method and the products of the project to apply them into the real life when working with vulnerable groups.

Opportunities

Because of this better understanding of the problems of each national vulnerable group, we have a very deep understanding of local situations (national situations) into an EU context.

Threats

A high academic level/content - context. Hard to translate into daily life context.

Which aspects are transferable?

The method can be applied as well in:

- science sector when you want to do a grass-roots involvement;
- non-governmental sector when you implement different project for people in need and you want to bring their expertise and their VOICE to Policy Makers.

Raising awareness on migration

All experts involved into this project are much aware about the migration phenomenon at EU level.

All academic people were very sad when this project was at the final Conference meeting because they said that this collaboration between academic and NGOs work was the hardest but the most beautiful one of their entire life time academic job.

4 NGOs from this project apply for a different project at EU that was approved and this means that the work will continue at NGOs level.

A smart method for vulnerable groups

The method is a new one at social-economical science level.

Each partner used the method in absolute different context. The vulnerable group was different from country to country (In Romania we work with migrants and Roma people; in Austria they work with unemployed women over 50s, in Ireland they work with homeless people; in Scotland they work with people with mental health problem, etc).

Each partner was using a different space of working (inside of organizations, in hospitals, in Mayor Hall, in a public Conference Centre etc.).

Each partner was using different non-formal methods to interact with the vulnerable group and to have a common dialog between citizens and researchers.

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Growing Bottom-Up - APPE Ciumârna

Alina Scânteie

Community Development

In this practice, we present the involvement of citizens through science and education, through teaching and develop the community. One of the best smart practices that we have: 'Growing Bottom-Up' Method.

The method is based on the cooperation between Belgian-Netherland and Romanian informal groups, groups of citizens that want to be involved in the development of the communities they live in.

The cooperation started 27 years ago, but the method was applied much later. First, the groups from Belgium and Netherland came with materials, clothes, medicine for the citizens in the communities from Romania (after Ceausescu communist period time).

At some point, citizens in Romania started to have the desire to help as all the other members in the community and came to the conclusion that they need to develop themselves and to work together with the local authorities and ask for the help of experts to get to the results they needed.

Therefore, some groups in Romania decided to join "The Open Network for Community

Development Foundation", in order to access the trainings and the knowledge of the experts in the network.

One of these organizations is 'Proiect Pro Europa Association' - APPE, from Ciumârna village, Suceava County. It started as an informal group. They were a few people that wanted to make a change in the community they were living. The village is small, from rural area, from disadvantaged commune, with families with lower economic or lower educational potential, who often do not see the benefits of the citizens' involvement in the community.

Currently, great part of the active population has left or leaves the village, attracted by gains resulting from economic activities specific to the cities or those carried out abroad.

This practice is about development of civil community organisations at the rural level: informal group, trained, developed and then transformed in an institution with own management (association). After the association establishment, the training continues, they get support by involving them in projects, collaborate with them as an equal partner.

Members from APPE participate to trainings in writing applications for funds, participate in mobilities in foreign countries, raising their skills in using technology, learning about European policies, about other cultures, other currency, other traditions.

They are now writing and implementing their own projects, with little help from the experts of "The Open Network for Community Development" Foundation.

Citizen science aspects

We think that our smart practice is a success story. 'Proiect Pro Europa Association' – APPE, is a non-profit organisation, established in 2014 by a teacher and her husband. They started in organising small activities in the community (before 2014) with the help of other members in the community. At some point they meet with experts in TON Foundation and started discussing about how they can get more involved in the community by using all the technology, information and science.

They participated at the training held by TON Foundation and after some years of building the courage, they decided to make their organisation: 'Asociația Proiect Pro Europa' – APPE.

After just 5 years, they have a lot of projects and activities to be proud with: projects of growing the knowledge of the members, trainings in adult education (participating or being partners in implementation), applications written and being financed, awards gained by the coordinators of the Association.

Methodological approach

What we do:

- take an informal group;

- train them;

- bring them to your trainings and meetings;

-teach them until they can develop themselves into an association, in an institution with own management, with juridical responsibility;

- all of the development is made by training with involvement of the members from the community but having at the basis a science - the development from bottom-up; - 'Growing Bottom-Up' - of the community, from the citizen to up.

How to involve science in the same time:

- involve the European policies;

- involve the citizen;

- involve the teaching;

- have as the basis a science - development from bottom-up.

In general, the effects are visible after the first meeting in the community. The desire of the members is very big. They just need the information that the use of science is at their hand and that they can do a change in community they live in.

S.W.O.T.

Strength

In every community, citizens can gather and act in the interest of the development they are living in. With the involvement of citizens through science and education, through teaching to develop the community.

Weakness

Dependent of the projects and fund raising of citizens, no budget from the local/national authorities.

Opportunities

Possibility to take action in the development of the community needs and act on the priorities of the members, not expecting for the strategies of the authorities to align with the needs and wishes of the citizens.

Threats

Decreasing of the involvement of the citizen in the development of projects and programs

that aid to the strategy of development of the government sector. Aging of the population and departure of the young citizens to big cities or other countries.

Which aspects are transferable?

All the aspects are transferable. Throughout this method, we can increase the involvement of the citizen in the development of projects and programs that aid to the strategy of development of the government sector. This can be made by attracting more funding in the community and by raising the level of adult learning programmes.

The Alternative Learning Laboratory

In 2016, APPE have implemented the project Alternative Learning Laboratory - Funded by Vodafone Romania Foundation and Community Support Foundation, Investments for Sustainable Communities.

The activities in the project were addressed to all children in the Vatra Moldoviţei schools and have been of the laboratory type, ie discovery based learning, research, direct and concrete creative experience.

An active learning that aims to train the child in the process of teaching, to show him how to learn, to help him in later learning, to gradually transform him into a "creative thinker".

Science for Community Empowerment

The 'Growing bottom-up' method can be used in all kind of structures. In schools, the teachers can use science to teach the students to do the same development of the community, by learning new and creative ways to learn, to use the technology.

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Environmental education at Wigry National Park

Marta Makowska

Environmental Education not just for schools

Classes are organized by the Department of Environmental Education in Wigry National Park with its seat in Słupie.

Classes in the fresh air and in the laboratory are offered from May to September each year. Target groups are children in the kindergarten to secondary school age bracket.

The centre offers classes for organized groups (schools), but also for the groups of fiends or for those who are interested in taking part in such kind of classes.

Citizen science aspects

The participants can choose any topic offered by the centre. They can also propose their own (connected with water pollution or

with the observation of some bird species). With some help of experts they can continue projects they started at school and in the classroom. They may also broaden their research.

Wigry National Park presents the research aspects of nature for the residents of Suwałki region. The centre encourages to observe the nature that is all around us and to do the research on one's own.

Experiental Learning

Depending on the research project we need different materials. Some of them are provided by participants during classes.

Classes usually last four hours and a half. During that time, depending on the type of classes, participants work outside, in the forest, by the lake and in the laboratory equipped in microscopes that are available to each of them.

Good-quality laboratory equipment makes classes more attractive. But also an opportunity to talk with an expert that can tell us about the nature that is all around us and where we should start our search is very fascinating.

S.W.O.T.

Strength

Classes encourage their participants to do the research on one's own and to get to know the environment we live in. They are supported by the famous centre located near the National Park.

Weakness

Classes cannot be organized without an expert. The kind of classes depends also on the weather.

Opportunities

Educational classes offered by Wigry National Park are an opportunity to introduce children and young people to the environment that surrounds us. They also instil passion for nature in participants and make them interested in scientific research.

Threats

A threat can be the lack of funds to organize educational classes. The classes are partly-paid, however, a considerable part of costs is covered by the centre itself.

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Which aspects are transferable?

By creating a necessary laboratory base and a group of experts it is possible to build a small centre that will organize similar classes for children and young people.

A training turned into a career

An interesting story told us the manager of this centre. One of the present employees of Wigry National Park was the participant of educational classes organized by the centre. The employee started their adventure with scientific research as a small child attending classes in Wigry National Park.

Everyone can be a scientist

Classes introduce people to the world of science and research work. They also show that each of us can be a scientist exploring the world.

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Robotics for intellectually disabled - Special Education and Pedagogic Centre in Suwalki Midicentrum

Marta Markowska

Inclusive Robotics

Robotics classes are organized by MidiCentrum – Creative Centre of Science and Technology in Suwałki. From the beginning of its establishment Midicentrum has been taking action to introduce technology to all age groups, including intellectually disabled.

By these actions the disabled can leave the margin of environment they live in. They can feel the part of society that use modern technologies and see a quick and stunning result of their own actions.

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Technology for all

The participants have an opportunity to take up the same technological challenges as people without disability.

Through all that time they are active – using the computer, building the robot and programming.

It improves their self-esteem, makes an opportunity to interact with people without disability and to start conversations on topics that are attractive to both groups.

The process of creation gives the participants the sense of active involvement in a technological life of modern society.

Methodological aspects

The participants usually work in pairs or individually with a little help of their teachers. During classes we need a standard set of building blocks, a manual that is available online and a programming panel.

The classes usually last 90 minutes. During these classes the participants build a simple robot, they programme it and finally, they have some time to play with their constructions.

We prefer work with individual approach to each pair, in comparison to forum, because of the different pace of work of our participants.

S.W.O.T.

Strength

Classes give a lot of satisfaction, both to the participants and teachers.

Weakness

Not all of the disabled can take part in such kind of classes.

Opportunities

This kind of classes and topic integrate groups and it is an opportunity to get to know the world of technology without any fears and with the sense of agency.

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Threats

In a situation when there is only little help from teachers of the given group, classes can exploit the instructors a lot.

Which aspects are transferable?

Even small centre can offer such kind of classes when it is equipped with the right materials and technological base.

Empowering intellectual disabelled to use technoloy

As an example we can use a story of a teacher who observes a great commitment of a student who used to be an introvert and who achieves a personal success working to the end of the task or joy caused by the fact that the student finished the construction.

A smart way to learn about potentials

Classes are unique because of the participants – it is not so obvious among teachers that technology is suitable for intellectually disabled. The idea of creating such an offer is brave and innovative

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Less plastic – ideas and technologies from Poland

Marta Makowska

Less Plastics – more innovations

The idea of replacing plastic in everyday life with biodegradable materials that are not harmful to the environment is popular in all over the world. This trend is also common in Poland, especially among young scientists and people who are interested in environment protection. They show that by using simple methods and measures we can create an alternative to plastic. At the same time, they are an example for others that good ideas and practices are made not only in well-equipped laboratories of big concerns.

Circularity and sustainability - Citizen science aspects

The creators of new solutions in the field of environment protection usually have a passion for nature in private. They care for ecology everyday and issues connected with

natural environment are extremely important to them.

With their commitment and knowledge they can make up solutions that are innovative. They can also get to know what action people can take to limit the littering of the Earth.

Each project is another step to achieve the intended goal, even if it does not reach beyond the field of research and experiments.

Project based approaches with digital aspects

Depending on the research project we need different materials and resources, however, they should be the simplest, widely available

and environmentally-friendly. Some of the projects are funded by the university, other are funded by collecting money (crowdfunding) and some are funded by young scientists.

The development of social media has a positive influence on raising funds for different research projects, especially those connected with environment protection.

S.W.O.T.

Strength

Research projects are an important aspect of a single scientist development.. They also contribute to constant development of the design thinking and making the world a better place to live in.

Weakness

Not all, even successful projects are put into practice because some solutions are just too expensive.

Opportunities

Each action supporting balanced development showing that sometimes the solution is right next to us makes sense. It teaches creative and scientific look at the surrounding world.

Threats

In case of failures it can cause discouragement of the scientist or the whole research group. Sometimes, even after some

time, you can notice that the given solution is not right.

Which aspects are transferable?

It is possible to create a small research project dedicated to the specific field when you show commitment and have the necessary base that you can start with.

Maize Cutlery

For example, a group of students introducing into the market cutlery made of maize meal and potato flour or a graduate of industrial design creating an alternative to plastic packaging.

https://vimeo.com/269469061

Environment friendly and teaching science

Each search for an alternative to the factors threatening the environment is positive and it is worth imitating. It is also worth mentioning that young people feel the need to take on such projects.

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Designathon Works

Marta Makowska

Designathons – teaching creativity to children

The mission of Designathon Works is to unleash the creativity of children, teaching them to become changemakers for a better future. They work with children from regular environments and children in disadvantaged situations in equal measure.

The method was first developed in the Netherlands and tested during the first Global Children's Designathon in November 2014. During a designathon workshop children learn to desing, prototype with electronics and present their solutions to the SDGs, and in so doing contributing to and co-creating a better world.

Citizen science aspects of the Designathons

During the Global Children's designathon children in the cities around the world come together to work in parallel and desing & develop innovative concepts and bulid

prototypes for one of the Sustainable Development Goals. They present their ideas to each other, and at the end of the day to a panel of experts, and a public audience. With this project the ability of the children to imagine is highlighted and they are encourage to imagine and design a better future. The experience helps children become future ready through learning to design and use technology such as mini-motors and sensors.

Pedagogic/methodological aspects

The Designathon method combines aspects of Design Thinking and Maker Education, both approaches which are gaining ground in education systems around the world. It has an underlying pedagogical model inspired by Reggio Emilia, John Dewey's Child and Curriculum and Seymour Papert's Learning theory Constructionism. A designathon is a structured workshop in which children (ages 4 – 12 years) invent, build and present their self-devised solutions to a social or environmental issue around the SDGS. Workshop lasts four to six hours and is facilitated by education professionals.

S.W.O.T.

Strength

Designathon is an opportunity to strengthen the ability to take action by young people, to create the sense of unity with other children from all over the world concerning one idea.

Weakness

Participation in this kind of classes is formalized and it requires the previous registration.

Opportunities

Perhaps it will be the first step of young generation towards consistent and active response to the threats of modern world.

Threats

We should pay special attention to provide the high quality of our classes.

Which aspects are transferable?

So far Designathon Workshops have been held in The Netherlands, Germany, Philippines, Mexico, Ireland, Aruba, Croatia, Uganda and Bangladesh. Themes which were included: The Future Of Work, Circular Economy, Mobility, environmental Friendly Transport, Clean Water, City Of the Future etc. The variety of subjects and difference among cultures and countries confirm, that the method is easily transferable to almost every organization or school.

The variety of experiences of the children who take part in Designathon Works activities, their commitment and even small successes are the best example of how it works in practice.

Designathons – local, global events

Designathon is organized on a large scale, but it is held locally. It combines the energy of the children together with their commitment to the wildlife and world conservation. It supports the use of modern technologies to make the world a better place to live.

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STORIES of Tomorrow

Jens Koslowsky

STORIES of tomorrow – a cross-European project

Stories of Tomorrow (STORIES) was a research and development project funded by the European Commission, involving 15 project partners from 10 countries, starting in January 2017 and has ended in July 2019.

The project has used the concept of storytelling a catalyst for the effective interaction between art and STEM disciplines (Science, Technology, Engineering, Mathematics) which share in many ways similar values, similar themes and similar characteristics.

The STORIES project proposed to introduce creative approaches in STEM education to generate alternative ideas and strategies within scientific enquiry as an individual or group, and reasoning critically between these.

The project has designed and tested a new vision for teaching and help develop strategies for how teachers' roles and conditions can support and enable deeper learning for students. To do that, the project has included and used innovative and meaningful digital technologies, such as advanced interfaces, learning analytics, visualization dashboards and Augmented/Virtual reality applications and build a storytelling platform where students

will develop and publish stories about a Mars Mission.

STORIES has been implemented in schools in Germany, Greece, Portugal, France, Finland and Japan. The project has involved more than 60 teachers and 3000 students (5th and 6th grade – 10-12 years old) in two pilots that each lasted 5-6 months in each school.

Exploration and pioneering for kids - Citizen science aspects

Exploration and pioneering have inspired and shaped civilizations since the dawn of history. Such endeavors are distinguishing characteristics of an advancing civilization. As people explore, they discover, innovate, prosper, lead— and become great. In STORIES, we have selected as the main topic a major challenge for the humankind: The journey to Mars.

Space missions, both robotic and human, expand the knowledge of our planet, our solar system, and the universe, leading to the expansion of humankind itself from the Earth to the Moon, Mars, and beyond. The challenge of bringing life to Mars push us towards a deeper understanding of our anatomy and demands creative solutions to sustain humans in the journey to the red planet. NASA and ESA are planning to send people to Mars in the next 15 to 20 years.

The students of today – maybe one of the students who will be involved in the project – will be among the first people to set foot on the surface of Mars. In the framework of the project we are developing a framework which will offer to our students the opportunity to create their stories for the future of space exploration. We are offering them the latest technologies to enable them to generate highly imaginative possibilities and to support their deeper learning in STEM.

Pedagogic aspects – Creativitiy and STEM

The Creativity in Children

We were inspired by the ways young children learn: they create pictures with finger paint, they learn how colors mix together, create castles with wooden blocks, learn about structures and stability. We extended this style of learning, so that they continue to learn through a creative process of designing, creating, inquiring, experimenting, and exploring. Students learn to approach issues with a critical mind and a positive attitude towards problem

solving while enhancing communication & collaboration.

Combining STEM with Arts

The high-quality science education is one of the main pillars of the Responsible Research and Innovation framework that HORIZON 2020 programme. But there's more to education than following a STEM career. A lot more. That's why a new term is gaining *ahem* steam. It's called STEAM education and it's the idea of incorporating arts into a STEM-based curriculum.

In other words, let's help students think more creatively and better understand the problems they're already working to solve. Training in the arts has been shown to improve creativity and innovation as well as students' Deeper Learning (Fullan & Langworthy, 2013). Students learn to approach issues with a critical mind and a positive attitude towards problem solving.

Additionally, today' s global challenges request high level scientific knowledge. Such activities demand considerable knowledge in many areas, which they may lack.

STORIES ensured a continued learning process based on the deeper learning paradigm that addresses not just intellectual ability but also motivational ability. To accomplish a holistic assessment of STEM mastery within the deeper learning paradigm in science education, we developed standardized assessment tools that cover intellectual and motivational ability.

S.W.O.T.

Strength

This kind of learning is of great value to students and is increasingly considered as a high stake global educational priority (American Institutes for Research, 2014).

Weaknesses

Preparation and implementation in an educational school setting takes a lot of time for teacher unfamiliar with the story-

telling platform and the topics of space exploration.

Opportunities

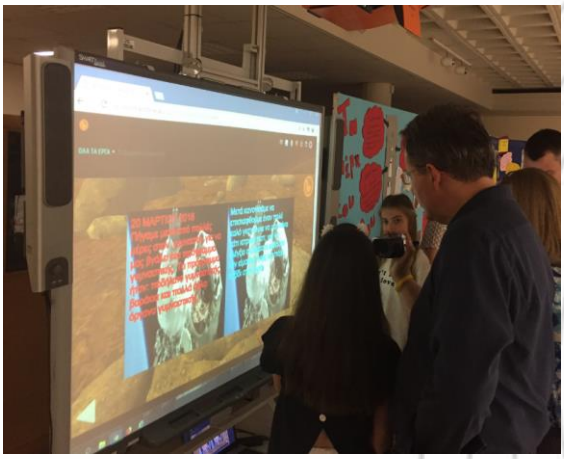
The exposure of students to the arts enhances communication skills, which are essential tools for collaboration. It develops flexibility and adaptability. In such an approach the artificial barriers developed over years among subject areas could be eliminated and students will be given a broader context for solving real-life problems, which demands the development of analytical, interpretive and evaluative skills used in many subject-matter areas.

Threats

Teachers are faced with a real challenge. Having specialized in an academic discipline, using the concept of STORIES may cause frustration to them when it comes to creating interdisciplinary, cross-curricular activities.

Which aspects are transferable?

As part of the support offered to the schools, teachers and students, the project team has developed a collection of guidelines and support materials. The support covers the following aspects that are crucial to enable the successful piloting in schools:



• Background information on the planet Mars and the challenges on Space Exploration

• Ideas and help how to support classroom activities

• Guidelines for assessing and evaluating the students' stories

• Information about the pedagogical framework

• A (technical) manual how to use the platform

The handbooks and project guidelines are available through the project's web site) and are made available in six languages (English, French, German, Greek, Finnish and Portuguese).

www.storiesoftomorrow.eu/?q=node/44text

A Journey to Mars

Ellinogermaniki Agogi (EA) Primary School participated in the STORIES implementation with seven classrooms (5th grade of Primary school) and a total of 155 students. The piloting started in mid-

October 2017 and was concluded in mid-May 2018.

In the beginning of the school year the R&D of EA in collaboration with the teachers of the school designed a 42-hour program, namely the "Mission to Mars" program, to be followed by all seven classes during the school year 2017-18. This program included detailed list of science activities (online, offline and hands-on) and educational resources that were to be used in the classroom. The implementation of all activities followed the inquiry-based teaching and collaborative learning models, and many of these were included and presented analytically in the STORIES Tool-kit.

To assess the impact of taking par tin the STORIES project, students' deeper learning was assessed before and after the project by its consequences, fascination for science and science knowledge. The data indicated a significant increase of science knowledge.

Digital Stories as mean to teach science

Digital storytelling is one mode of twenty-first century learning (Niemi H. & Multisilta, J., p. 4, 2015). Digital stories derive their power by weaving images, music, narrative and voice together, thereby giving deep dimension and vivid color to characters, situations, experiences, and insights.

With the current expansion of digital tools and on advanced interfaces, the media and the tools used for narrating are changing. Scholars in the field of media and education have found that "digital storytelling in many ways (helps) to support students' learning by encouraging them to organize and express their ideas and knowledge in an individual and meaningful way" (Sadik, p.490, 2008).

Digital stories have proven to be a powerful medium to express their voice with intellectual depth in a form other than writing. Students who were involved in storytelling activities were active architects of their own understanding (Papadopoulou & Vlachos, 2014, p. 250) while creating a digital story consists of using a mixture of visual, gestural, auditory and linguistic skills.

According to our view it is critically important for all children, to grow up knowing how to design, create, and express themselves. We are inspired by the ways children learn in kindergarten or in the first classes of the primary school: when they create pictures with finger paint, they learn how colors mix together; when they create castles with wooden blocks, they learn about structures and stability. We want to extend this early style of learning, so that learners of all ages continue to learn through a creative process of designing, creating, inquiring,

experimenting, and exploring. Children have their own way to perceive the Universe surrounding them and their own interpretation of the meaning of life.

7

THE SCIE-CITIZENS PARTNERSHIP

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Comparative Research Network (CRN)

The Comparative Research Network was founded in 2007 and worked since then in the field of adult education. The CRN Network is specialised in training activities within the fields of intercultural competences, intergenerational learning, mobilities and migration. Additionally the CRN is specialised in creating and performing evaluation and dissemination processes. CRN lately gained through various projects both as coordinator and participant expertise in game design in education, storytelling and community reporting, where the network is currently carrying out training for a number of target groups.

Due to CRN being organised as a transnational network, it has an international scope. At the moment it employs 4 permanent and around 10 freelance staff, and has a network of more than 120 members, located in almost every European country.

As a NGO CRN is non-profit oriented and performs crucial part of its work on a voluntary bases. Major target groups of the CRN are beside trainer marginalized groups, such as persons living in remote rural areas, seniors and unemployed. Generally CRN is seeking to link social science with civil society actions - that is why CRN joined itself various local, national and transnational networks.

In its European Work as adult training provider, CRN coordinated already 4 Erasmus Plus Partnerships and participated in two more. During our intercultural training courses more than 200 facilitators (teacher, trainer) from all programme countries participated in three years.

In the research department CRN participated as impact partner and facilitators in a number of FP5-7 and Horizon 2020 projects. CRN has an outreach to more than 30 universities all across Europe.

As the latest achievement CRN started to edit and publish scientific and educational papers and books. All publication receive ISBN but are accessible open source and free of charge.

CRN has worked actively recent years in the field of adult education. Beside organising training, qualifying teachers and

performing research, CRN has developed with a consortium of European partners an evaluation system for intergenerational education and is working on topics like digital skill in education and creative methods in formal and non-formal education. In this context CRN was involved in finding strategies to establish quality tools for Life Long Learning, particularly on looking at how to recognize non-formal education. Since CRN is long active in Grundtvig and Erasmus Plus, our organisation gained practical experience in coordinating European projects.

The project team is comprised of staff which are highly experienced in European project management and has already performed and implemented successfully different EU programs. The team consists out of experts on evaluation and dissemination, IKT and digital methods as well as intercultural trainers. The whole team has worked already on different aspects on defining quality measure to validate non-formal education. In the consortium of partners, CRN will therefore work on creating evaluation systems, link the project work to science, perform crucial translation into German, one of the most important languages needed for dissemination of the products and policies developed through the project. CRN supports the consortium as well with it knowledge and trainers on intercultural competences. CRN will help to mediate potential intercultural critical situations within the consortium, but as well concerning the process in implementing the research and evaluation of the developed policies. Through its network, CRN will provide an interlink to other education sectors, just like universities, vocational training and schools.

In the scope of the project CRN is providing knowledge in adult education, trainings in urban and general participation and citizenship building. The project will benefit form the experiences in creating assessment tools and editing e-publications.

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School Raising

• Our Design Thinking workshops enabling schools to co-design concrete solutions while solving social challenges.

School Raising is a platform harnessing innovation into schools. We think schools are the best partners we can engage to enable the citizens of tomorrow to co-design solutions for the needs of our society. We make it happen creating opportunity of peer exchanges between teachers, students, parents, citizens and companies.

Our services:

• Cowdfunding platform: Support schools to fund own project by the crowd and share with them the rewards of the project itself;

• Crowdfunding at School, workshop providing the tools to co-create successful crowdfunding campaigns;

• Social Innovation Tour, aiming to contaminate students connecting them with social entrepreneurs and innovators in Bologna and Berlin;

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Ellinogermaniki Agogi (EA)

ELLINOGERMANIKI AGOGI

Ellinogermaniki Agogi (EA) is one of the most innovative schools in Europe. It has 2000 students (ages 5 to 18 years old) and 250 teachers in different disciplines. Established in 1995, the Research and Development Department of EA is guiding the introduction of innovation in the school setting. The R&D Department acts as an interface between the pedagogical research, the technological innovation and the school community.

It focuses on the design, implementation and support of pedagogical and technological innovation in educational practice, both through internal research as well as through collaborations with numerous educational, research and commercial institutions in Europe and the world. EA is an institutional member of EDEN (European Distance Education Network), of STEDE (Science Teacher Education Development in Europe), of ECSITE (European Network of Science Centres and Museums) network and a partner school of the German Excellence Network of STEM Schools "MINT-EC" (https://www.mint-ec.de/).

The work of the R&D Department which currently employs 18 full time researchers (10 PhD level, 8 MSc) focuses also on the following areas:

School Innovation and Leadership. The team is developing models and strategies to support the introduction of innovation in school settings. EA school offers a unique testbed for implementing and validating innovative strategies.

Development of methodologies and empirical research to investigate processes of learning and knowledge acquisition in various subject matter areas (physics, mathematics, biology, history, etc.);

Design and development of educational learning scenarios based on the concept of storytelling, which has been developed and tested in various EU projects and applied within European educational communities;

Cooperation and collaboration with Universities, research centers, museums and private companies for the development and testing of educational material and

software, using virtual and augmented reality;

Collaboration with computer science departments and artificial intelligence labs for the development of computational models and AI learning systems;

Design of technology-supported learning environments.

Its work in EU projects over the last 15 years has established EA as a leading pioneer in innovative approaches to science education. Since its establishment, the R&D Department has coordinated and supported the participation of EA, either as coordinator or as partner, in more than 150 national and international collaborative research projects and networks (H2020, eContentPlus, ICT-PSP, SiS in FP7 and FP6, IST in FP5 and ICT in FP6, LLP-ICT, Socrates, Leonardo da Vinci, Erasmus+), the majority of which have been concerned with the fields of science and new technologies in education. The EA team has implemented numerous projects and initiatives that combine ICT and STEM education that include the development of innovative tools and approaches and development of contextual based storylines. Moreover, some of these projects have already combined STEM with Arts in a creative way to support students' deeper learning, e.g. by developing and performing a global science opera that included the collaboration of students, scientists, artists, and educators form 35 countries. The EA team has a systematic and exhaustive knowledge of the science curriculum in the Greek primary education, as it has been assigned to create the science text books for the last two grades of primary schools in Greece. The books of the series "Primary Science: Researching and Discovering" which introduced the inquiry based science education model for the first time in Greece are now being used in the 5th and 6th grade in all schools across the country.

In addition, EA is a founding member of the European Science Education Academy (ESEA - http://esea.ea.gr/), which is promoting a European standard-based IBSE competence framework that will facilitate the professional development of teachers in applying and implementing IBSE, as well as supporting the creation of a European community of practice among science teachers to modernize science education. Overall, EA has a very strong and proven experience in actively extending the dialogue between scientific and the educational community, enforcing the collaboration between schools and research organizations, centers and museums, and helping young people to acquire better understanding of the role of science in the society.

EA has a very strong vision-generated interest and rich research and development

activity in the fields of Inquiry Based Science Education (IBSE), Project Based Learning (PBL), and STEM education in combination with digital, online based learning environments and tools that use virtual reality, augmented reality and story-based education.

EA is continuously modernizing STEM education by promoting and creating user-driven learning environments for students and offering numerous opportunities for teachers' professional development to be prepared and thrive in the landscape of unprecedented challenges and opportunities in the 21st century. Under this approach, EA has taken up the challenge to embed innovative pedagogical practice that effectively uses a range of ICTs in STEM classrooms, as well as driving up student academic outcomes across the school. Moreover, a large range of previous projects were focused on developing and implementing technological tools which leverage both digital science repositories and IBSE/PBL learning.

As part of this, EA has developed numerous scenarios for STEM education in which participators live their learning experience in every place. EA, apart from being a primary and secondary education school, is working closely with children groups as part of its outreach activities and has interests in the research findings, access to training for teachers to introduce immersive technologies in their schools and classrooms as well as the projects reports regarding the new pedagogical and didactic methodologies in science teaching and the introduction of ICT tools. Suitable provisions will allow such access to project results as to promote scale – up in the participating to the pilots countries and beyond.

The EA R&D team believes that Virtual & Augmented Reality Labs are not just a new technological hype. Startups are emerging from all over the world, creating the virtual and augmented reality environments needed for many fields of science. The success of these efforts will be based on two very important factors: users & content. EA aims to become a significant transnational player of the Digital Storytelling industry, producing innovative educational scenarios and assets for the new era of digital education, generating young people who are skillful in and enthusiastic about science and who view science as their future career field, aiming to innovate and change the world and also creating teachers willing to embrace the virtual laboratories and exploit their full potential.

Finally, EA through its very rich research and innovation activities in the last more than 15 years in the fields of education and learning more widely, has established a very large network of collaborations and

links in the academic, industrial, policy-making and everyday school practice worlds. EA will utilize this network for the wide, carefully targeted dissemination of the concepts and outcomes of the project to all stakeholder groups both in Greece and Europe-wide. EA is standing at the 11th place in the European Research ranking for Greece for 2017 (http://www.researchranking.org/index.php?orgtype=EDUCATION&c=5&country=GR&year=2017&action=ranking)

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Centrul de Resurse și Consultanță în Educație - CRCE

Our mission is to provide learning experience for adults across Europe. Adults can learn from each other, having personally and professionally development, build new strategic partnerships and future steps for their organizations, associations, public and private institutions and communities.

Through teaching and training assignments, international or national workshops opportunities, community actions - adult professionals exchange experiences and best practices in different fields and develop, grew and adapt new strategies or policies in their activity field.

Adult educational opportunities provided by CRCE (within the Erasmus+, EU programmes) are addressed to professionals, educators, policy makers and trainers.

CRCE contributes to Adult Education development by organizing programs, workshops, courses (ERASMUS+) for professionals in various fields. Our target groups are working with our experts in Germany, Romania, Italy, France, Belgium etc. - for developing new strategies, tasks and frameworks related to their profession, learning and teaching methods related to their fields of expertise. The target groups are also encouraged to create common projects or initiatives.

More adult learning events and more international exchanges can help Europe overcome the economic crisis, meet the needs for new skills, keep-up its ageing workforce productive and develop "new skills for new jobs" for the new generation.

Learning is the essential key for social inclusion, active citizenship and a solider Europe. These days, people cannot just rely on skills they acquired in a formal education system. Adults have to be in an on-

going process of learning through their entire working life.

As in EU, statistics is pointed that participation rates are especially disappointing for low-skilled and older adults. CRCE is increasing knowledge about successful policies, provide support to individuals and institutions and enable a better exchange of experiences between countries and professionals in order to contribute to a better Europe.

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Społeczna Akademia Nauk (SAN)

SAN is a private University situated in the third biggest city in Poland. SAN was established by the Association of Polish Educators in January 1995. Currently there are ca. 20 thousand students enrolled in the Academy. SAN offers PhD, MA and BA studies, post-graduate courses as well as specialized training courses on daily, evening and weekend and extramural basis. SAN is also very active in scientific research, organisation of national and international conferences and publishing scientific book.

The University prides itself on conducting scientific and research projects in all its departments. These include faculty-oriented research projects as well as conferences. The scientific research carried out in the University Departments includes research work done as part of research projects funded by the European Union and the Ministry of Science and Higher Education, as well as faculty research projects (over 50 research programs as well as scientific and implementation projects).

SAN provides filed of studies in several areas: business- economic; artistic; law, IT, medicine and socio-humanistic.

SAN employs more the 600 academic teacher and almost the same number for administration issues.

SAN has positive assessment by the Polish Accreditation Committee and New England Association of Schools and Colleges (NEASC).

SAN provides courses and training of adult education via Centre for Adult Education

- SAN provides scientific researches in many different disciplines form humanistic to technical
- We offer regular classes for students and doctorates how to make scientific research
- SAN co-operates with large number of voluntaries and NGOs
- The University is very experienced in involvement in EU educational programme since 2005 as a coordinator and partner. Since 2005 at the University exist Fundraising Department (4 persons permanent staff), which is responsible for creation and management of EU projects. Since 2005 the Department was dealing with 62 projects from different EU programs.

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Changemaker

We´ve been working with helping local communities, especially in suburbs of the big cities in Sweden, to start up projects.

Changemaker is a private held consultancy company (established 1998) with extensiveknowledge and experience in fundraising and project development, matchmaking and innovation services, digital service development, games and visualisation.

Based in Gothenburg and Stockholm, Sweden, with partners and customers in Sweden, Denmark, Germany.

Employees at Changemaker AB has been project managers for several European Union granted projects during the last ten years.

Changemaker AB is the owner of Changemaker Education AB a company specialised both in tailor made company training courses and in vocational training (www.myh) in which more than 800 students have participated during the last 15 years.

MIDICENTRUM – Kreatywny Ośrodek Nauki i Technologii w Suwałkach,

Biblioteki Publicznej im. Marii Konopnickiej w Suwałkach.

The main objectives of the Public Library in Suwalki are promotion of reading among children, youths and adults including seniors as well as the creation of a library as a friendly, trusted and social place which unites all local activities. The library also runs cultural activities for children and youths (e.g. recitation competitions, art and music activities, urban games, language courses, etc.) meetings with writers, travelers, poets; exhibitions, conferences, meetings with animators and interesting people.

The clients of library services are all 70,000 habitants of Suwałki city. In 2016 all the library's departments served 10,000 readers, 125,000 visits. More then 10,000 visits took place in Midicentrum. It's there where most of Suwałki's children get their first touch with science and technology.

The library runs modern Midicentrum - Center of Science and Technology in Suwalki which undertakes robotics, computer graphics, engineering classes as well as language and creativity lessons.

The library as a place of training of personnel for science and modern sectors of the economy. Such initiatives are especially valuable in the regions where education is not adapted to the changing requirements of the labour market. The inhabitants of Suwałki have a chance now for a better start in their professional life but also for science volunteering owing the creative centre of science.

It is equipped with high-tech multimedia equipment and educational programmes (electronic panels, special keyboards, three-dimensional teaching aids, computer software, and network databases). Young people are able to, among others, create films and animations, music, learn languages, learn about the operation of solar, wind and hydropower plants, program mini robots, and the youngest children, through games and puzzles media, are learning, for example, traffic rules. The classes in the centre enrich school programmes with modern science technology, developing students' abilities and interests. More than 10,000 people in

the target group, or the pupils from middle and primary schools, benefited directly from the interactive science and technology centres during the year 2016.

The centres are also available for adults. We think especially about attracting teachers and leaders of hobby groups (also scientific) to our center. The mission of Midicentrum states that local community should be involved in creating of social change using the science. So meeting with international group of experts and partners will help us to fullfill this goal.