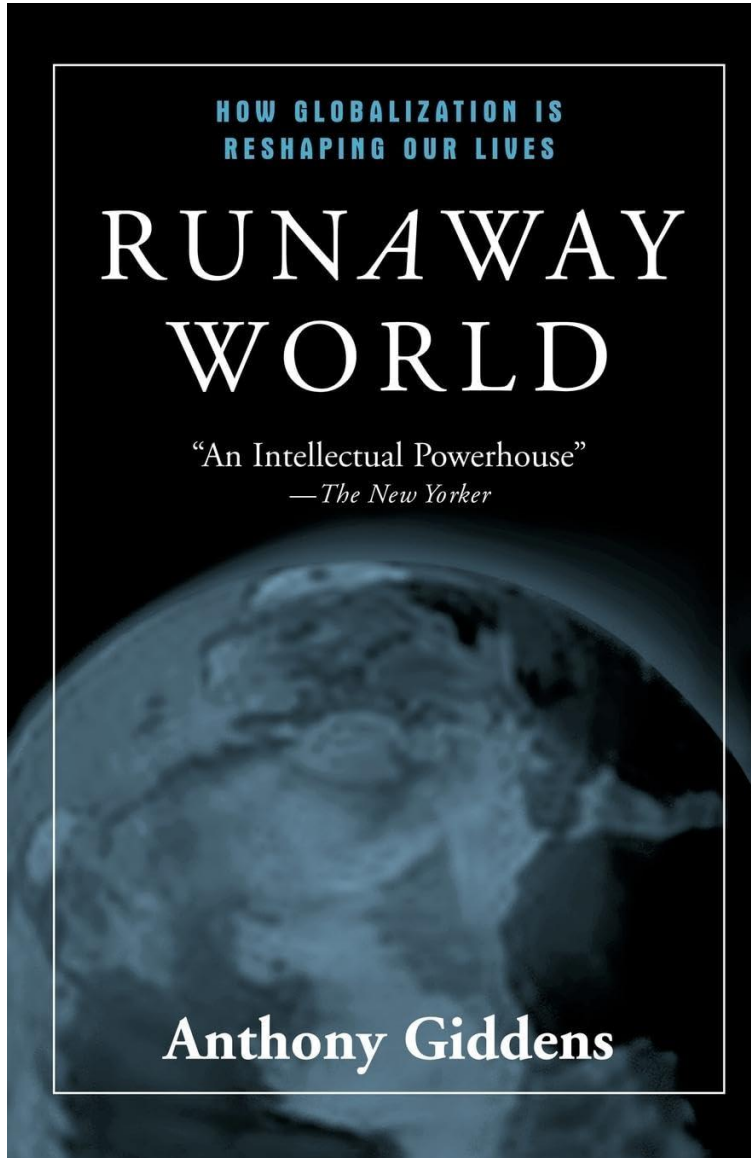


Multipliers – open schooling: H2020 project results

Gregor Torkar

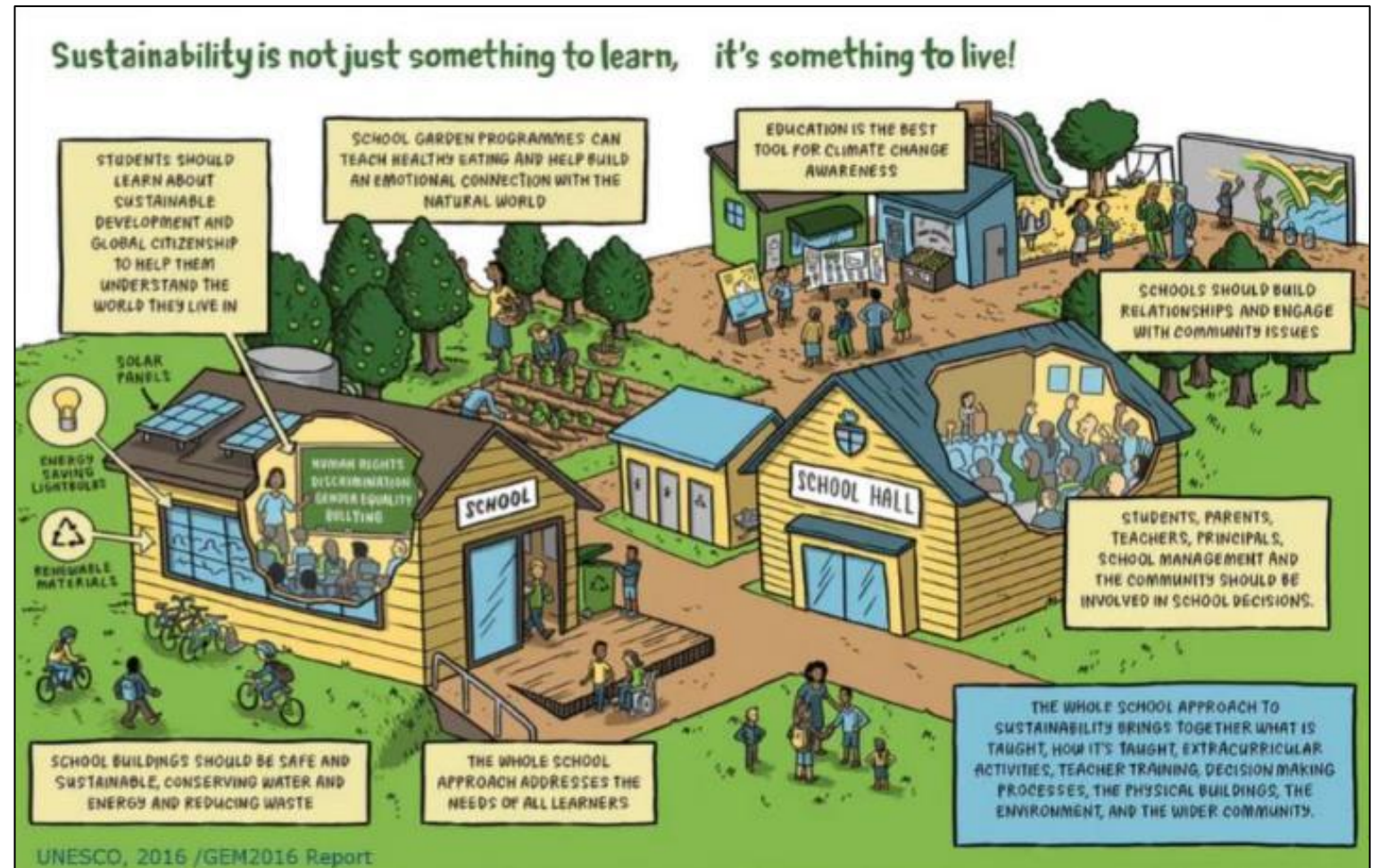
University of Ljubljana & UNESCO Chair on Teacher Education for
Sustainable Development



- Global competition and technological developments
- Our population is growing and also aging; more people are living in urban areas and in smaller households.
- Children entering school now will live beyond the end of this century and are likely to change careers two or three times over their lifetimes. (EC, 2015; Tsai, 2014)
- Formal educational systems is adapting too slowly to changes (Fordham, 1993)
- Lack of teaching practices required to meet the diverse needs of 21st century learners.

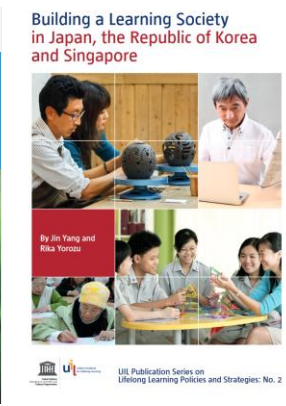
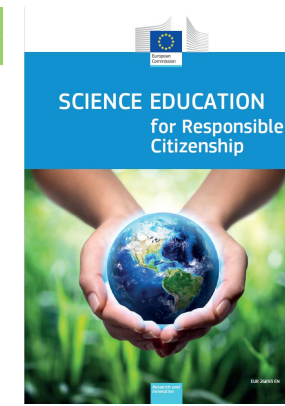
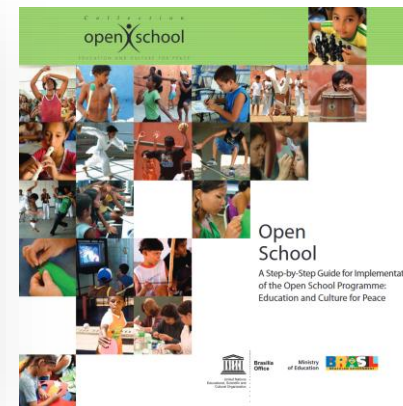
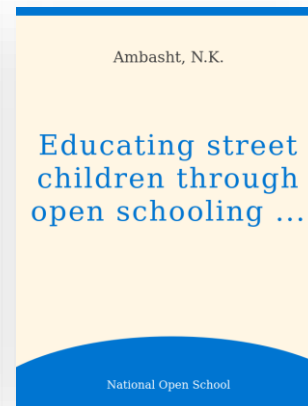
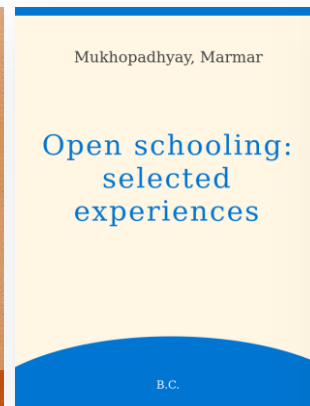
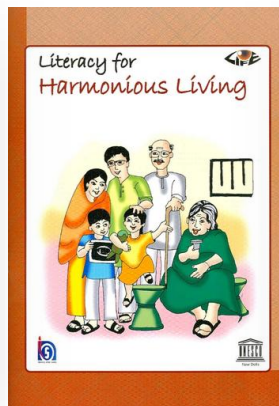
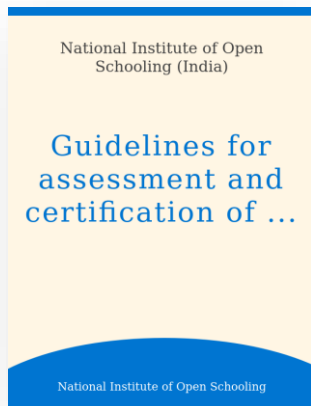
Transformative Education

- Value-based Education
- Problem-based Education
- Environmental Education
- Education for Sustainable Development
- Sustainability Education
- Place-based Education
- Place-responsive Education
- Outdoor Education
- Greening School
- Citizen Science
- Open Education
- **Open Schooling**
- ...



Defining open schooling

- **Open schooling**, which encompasses is an **entirely different approach to „what“, „where“ and „when“ people learn.**
- Open schooling invites policymakers, schools, parents, community, academia and enterprises to become collaborators in reshaping the educational experience and **transforming the way students learn**, at the same time **strengthening the link between learning and society.** ([Open Schooling Roadmap, Open Schools for Open Societies, 2017](#))
- Open learning and open (school) schooling are very broad terms describing learning which is **„open“ in terms of timing, location, teaching roles, instructional methods, modes of access**, and any other factors related to teaching and learning processes (www.ecsite.eu).

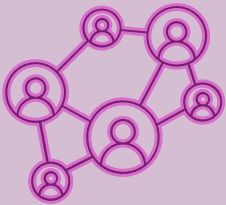


Defining open schooling



Regular schooling

- Formal education
- Student-teacher interaction
- Inflexible educational strategy
- Strict timetable
- Classroom education



Open schooling

- Formal, non-formal and informal education
- Students engage with the wider world and other people, not just teachers, take the teaching role
- Flexible educational strategy
- Students progress under their timetable
- The learning environment is extended beyond the classroom walls (online and offline)

Defining open schooling

Modes of access

- **Distance learning** is the education of students who may not always be physically present at school or where the learner and the teacher are separated in both time and distance. Distance education is a technology-mediated modality and has evolved with the evolution of technologies such as video conferencing, TV, and the Internet. Can either be completely a remote learning (e.g. m-learning, e-learning, MOOCs) or a combination of both online and traditional offline instruction (hybrid or **blended**).
- **Blended learning** is blending different learning environments - school site and other distance environments. It is also blending different tools – digital and non-digital.
- **BIP – Blended Intensive Programme**

Defining open schooling

Teaching roles

- **Formal education:** organised, hierarchically structured, chronologically graded 'education system', running from primary school through the university and including, in addition to general academic studies, a variety of specialised programmes and institutions for full-time technical and professional training.
- **Informal education:** lifelong learning, whereby every individual acquires attitudes, values, skills and knowledge from daily experience and the educative influences and resources in his or her environment – from family and neighbours, from work and play, from the market place, the library and the mass media.
- **Non-formal education:** organised educational activity outside the established formal system – whether operating separately or as an important feature of some broader activity – that is intended to serve identifiable learning clienteles and learning objectives.

(Coombs & Ahmed, 1974; Fordham, 1993)

Defining open schooling

(Key drivers by EC, 2010)

Inclusive

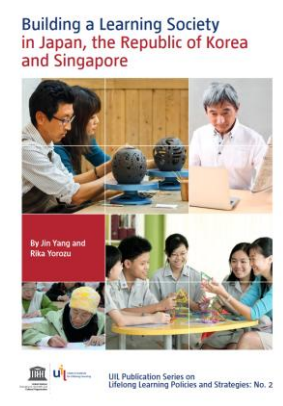
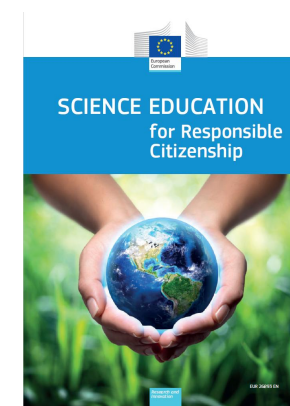
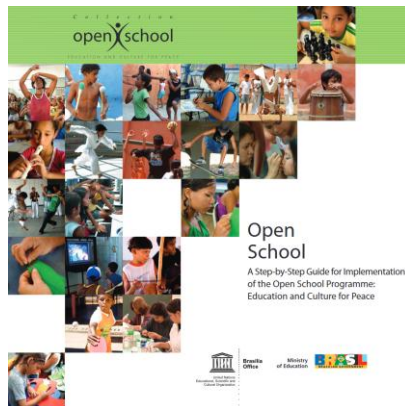
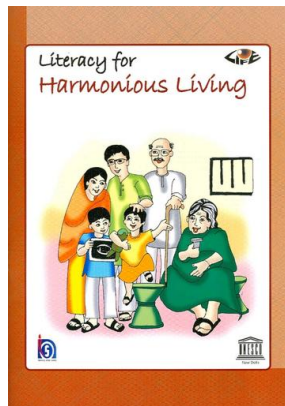
Inclusive growth: raising participation in the labour market, the acquisition of skills and the fight against poverty;

Sustainable

Sustainable growth: making our production more resource efficient while boosting our competitiveness.

Smart

Smart growth: fostering knowledge, innovation, education and digital society;



Defining open schooling

(Key drivers by EC, 2010)

Inclusive

Inclusive growth: raising participation in the labour market, the acquisition of skills and the fight against poverty;

Sustainable

Sustainable growth: making our production more resource efficient while boosting our competitiveness.

Smart

Smart growth: fostering knowledge, innovation, education and digital society;



*The open schooling system is a flexible and inclusive educational framework that allows learners **to pursue education outside the traditional set up**. It offers an opportunity for individuals who are unable to attend regular schools due to various reasons, such as work commitments, geographical constraints, or personal circumstances. Open schooling provides flexibility in terms of study pace learning environment and curriculum choices, **making it accessible** to avoid wider audience. The open schooling system is open to learners of all age groups. However, certain courses may have eligibility criteria based on the educational background and previous qualifications of the learner ([National Institute of Open Schooling, India](#)).*

Defining open schooling

(Key drivers by EC, 2010)

Inclusive

Inclusive growth: raising participation in the labour market, the acquisition of skills and the fight against poverty;

Sustainable

Sustainable growth: making our production more resource efficient while boosting our competitiveness.

Smart

Smart growth: fostering knowledge, innovation, education and digital society;



*The Making Room/Open School Programme consists of making public school spaces available on weekends, offering activities in the areas of sport, leisure, culture, digital inclusion, and basic vocational training. By contributing to breaking the institutional isolation of schools and placing them at the heart of coordination with the community, the programme embodies one of the principles of a **culture of peace**: fostering the co-existence of different groups and favoring **conflict resolution** through negotiation. (UNESCO, Brasil, 2009).*

Defining open schooling

(Key drivers by EC, 2010)

Inclusive

Inclusive growth: raising participation in the labour market, the acquisition of skills and the fight against poverty;

Sustainable

Sustainable growth: making our production more resource efficient while boosting our competitiveness.

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Smart growth: fostering knowledge, innovation, education and digital society;



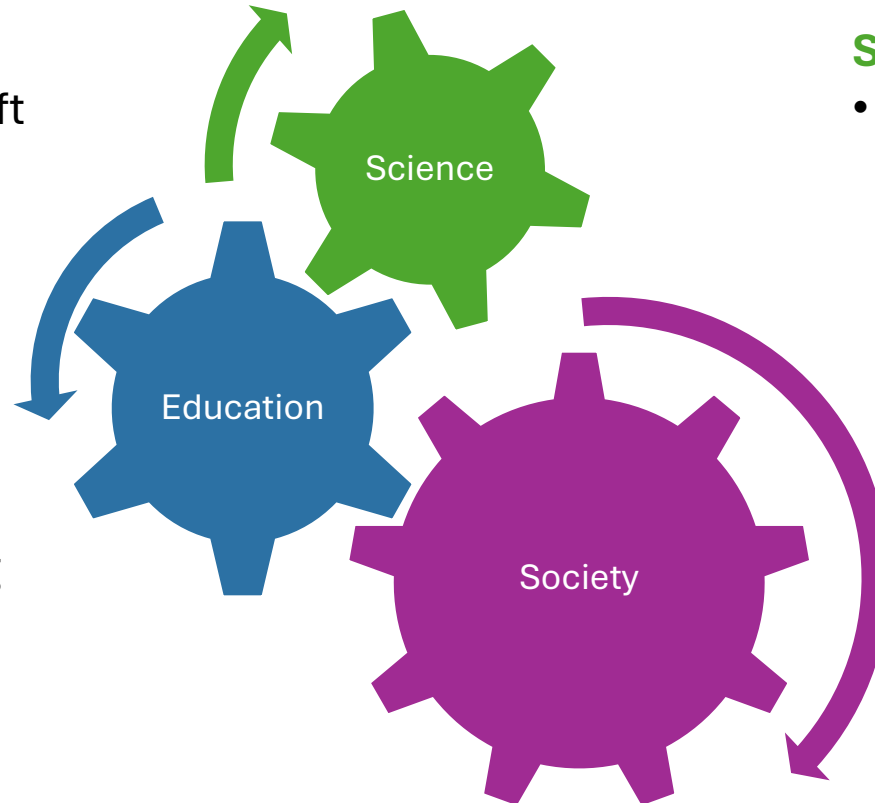
*„Open schooling“ where schools, in cooperation with other stakeholders, become an agent of community well-being should be promoted, families should be encouraged to become real **partners in school life and activities**, professionals from enterprises and civil and wider society should actively be involved in bringing real life projects to the classroom. Partnerships that foster expertise, networking, sharing and **applying science and technology research findings across different enterprises** (start-ups, SMEs, larger corporations) shall be promoted. Gender and geographical differences should be considered. (Science with and for Society (EC, 2015; SwafS-15-16; SwafS-01-2018-2019-202): Open schooling and collaboration on science education)*

Defining open schooling

Science and Society → Science with and for Society

Education:

- **Students:** real life situations, soft skills, active citizens in their communities.
- **Teachers:** teaching skills, collaboration skills, enrich curriculum.
- **Schools:** network with different organisations and local communities, support in dealing with local problems.



Science with and for Society

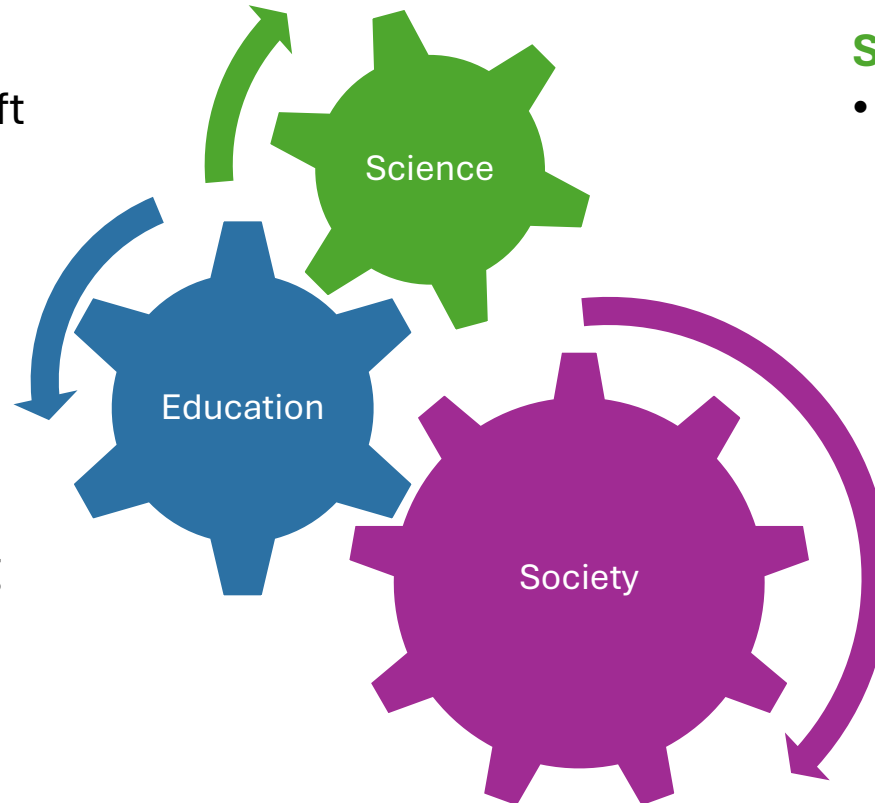
- **Responsible Research and Innovation:** Transforming new ideas gained from research into useful knowledge, products and services depends upon deeper and on-going connectivity between schools and non-formal and informal learning environments, families, enterprises, civil society and government ([Lemos et al., 2012](#)).

Defining open schooling

Science and Society → Science with and for Society

Education:

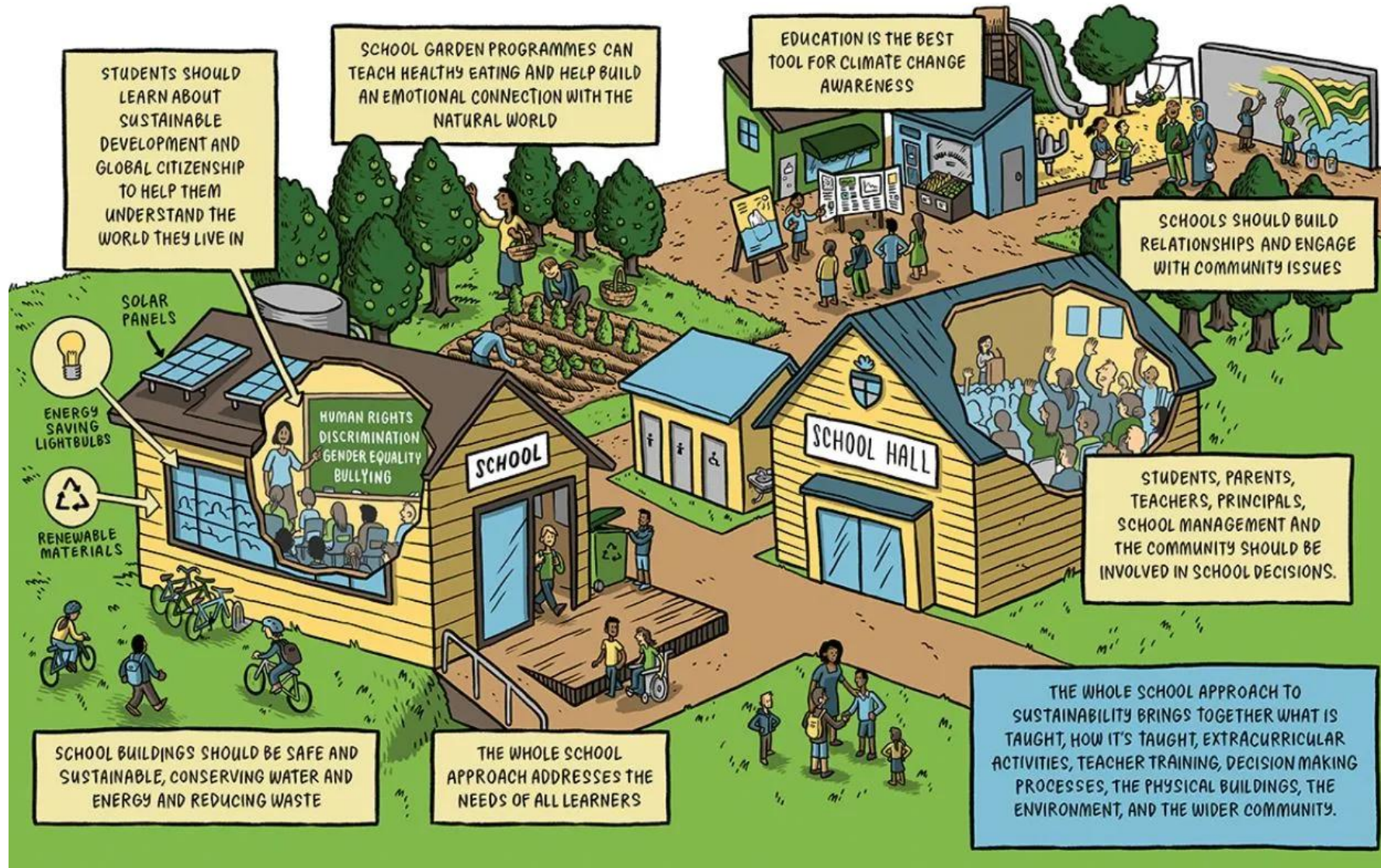
- **Students:** real life situations, soft skills, active citizens in their communities.
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Science with and for Society

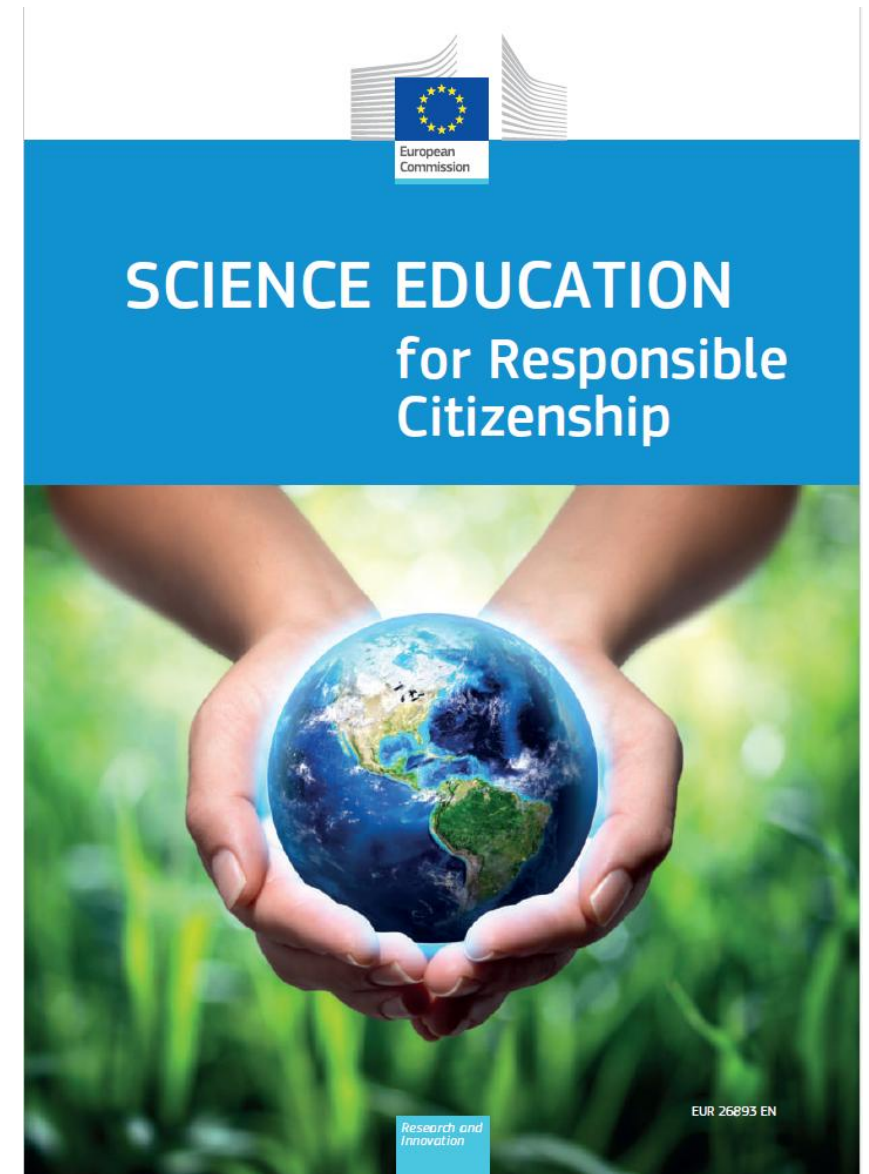
- **Responsible Research and Innovation:** Science education helps us understand our world, to manage risk and put uncertainty into perspective, to guide technological development and innovation and to forecast and plan for the future. It improves job prospects, cultural awareness and our ability to act as well-informed citizens in solidarity with citizens around the world (EC, 2013).

Sustainability is not just something to learn, it's something to live!



Defining open schooling

- To help all citizens acquire the necessary knowledge off and about science to participate actively and responsibly in, with and for society, successfully throughout their lives.
- Guidance and recommendations concerning increasing the participation of enterprises and industry to science education policy and activities.
- Encourage “open schooling” where
 - **Schools, in cooperation with other stakeholders, become an agent of community well-being;**
 - Families are encouraged to become real partners in school life and activities;
 - Professionals from enterprise, civil and wider society are actively involved in bringing real-life projects into the classroom. (EC, 2015)



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- Science with and for Society (SwafS-15-16; SwafS-01-2018-2019-2020): Open schooling and collaboration on science education - Horizon2020)
- The projects, like **MULTIPLIERS Partnerships to ensure meaningful engagement with Science and Society (2021-2024, Horizon 2020)**, are fostering an open learning educational ecosystem that can equip students with all they need to navigate their lives today and anticipate future advances.
- MULTIPLIERS is a member of the Open Schooling Together initiative, a joint collaboration between several Horizon 2020 projects promoting the concept of Open Schooling. To learn more, [visit their website](#).



Open
Schooling
together



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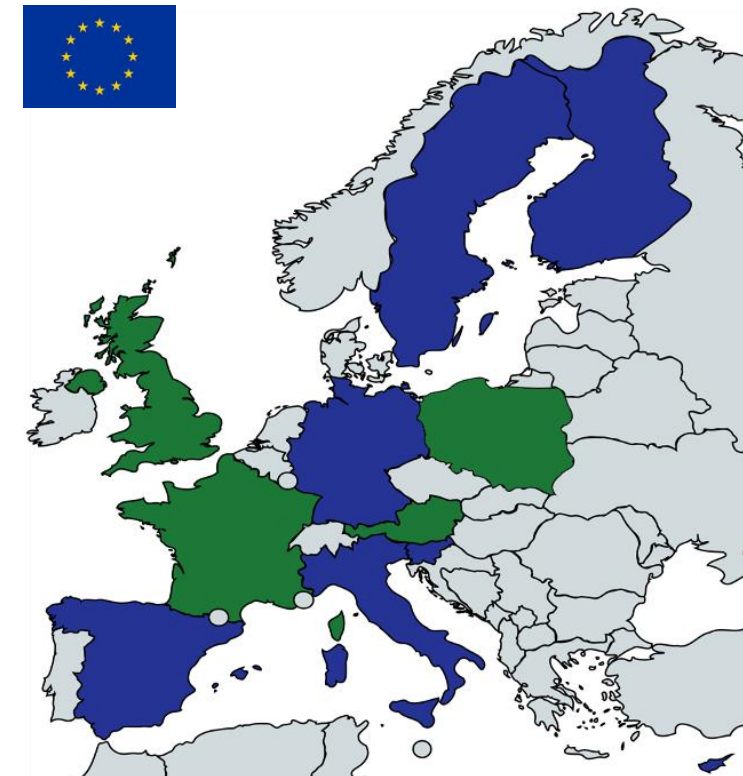
Main Objectives:

- Bridge the gap between school and real life
- Foster cooperation between schools and society
- Engage students in projects on diverse socio-scientific issues (SSIs)



Specific objectives:

1. Increase students' *interest* in science, *self-efficacy* for learning science, and *science career awareness*
2. Enhance *critical thinking* and *argumentation* skills

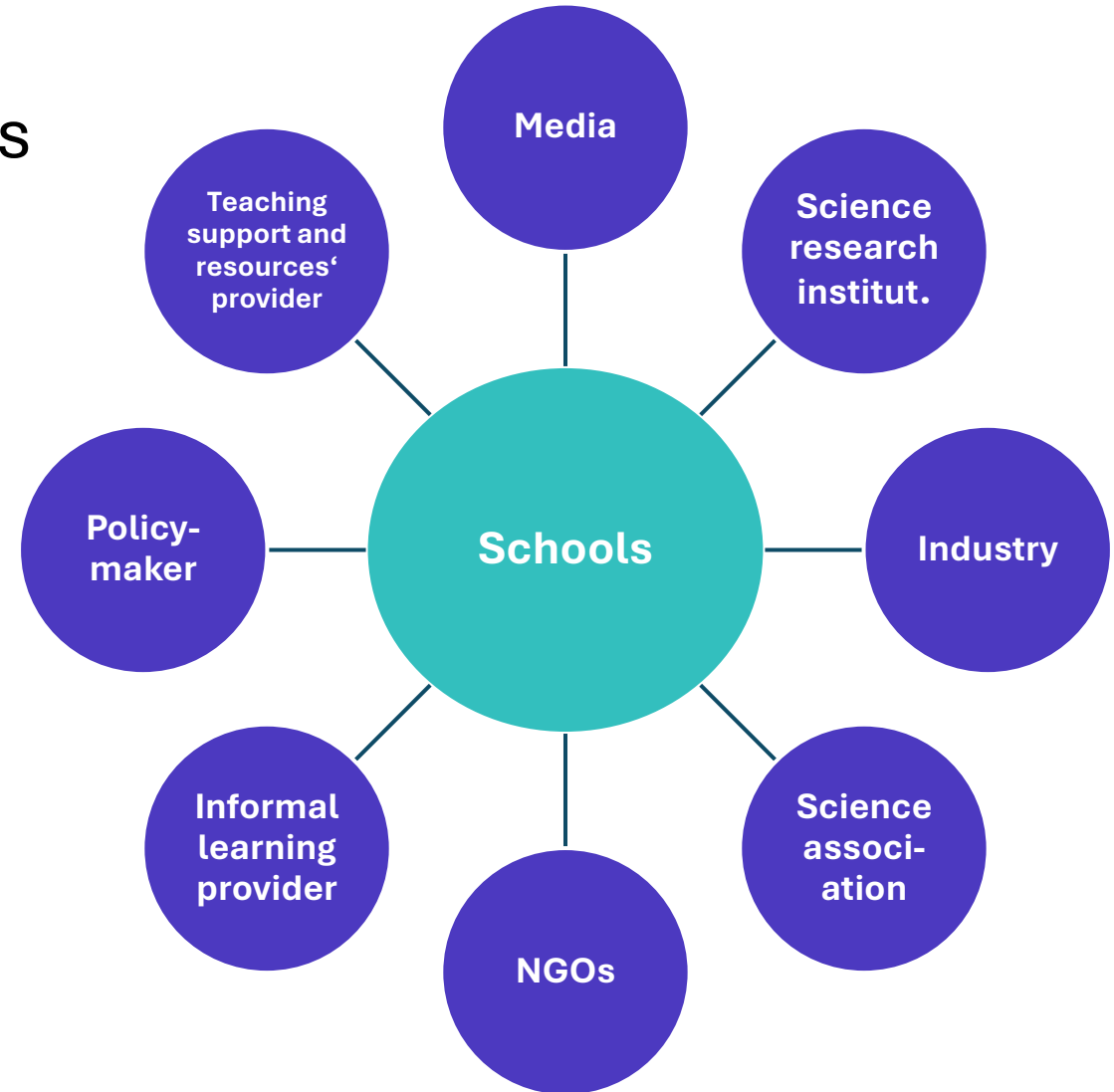


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Establishment of learning partnerships

- Students work with various stakeholders, gaining first-hand experiences and insights into science practices and discussions
- Students then act as “multipliers”, sharing their knowledge

Open Science Communities (OSCs)



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MULTIPLIERS operational definition of Open Schooling

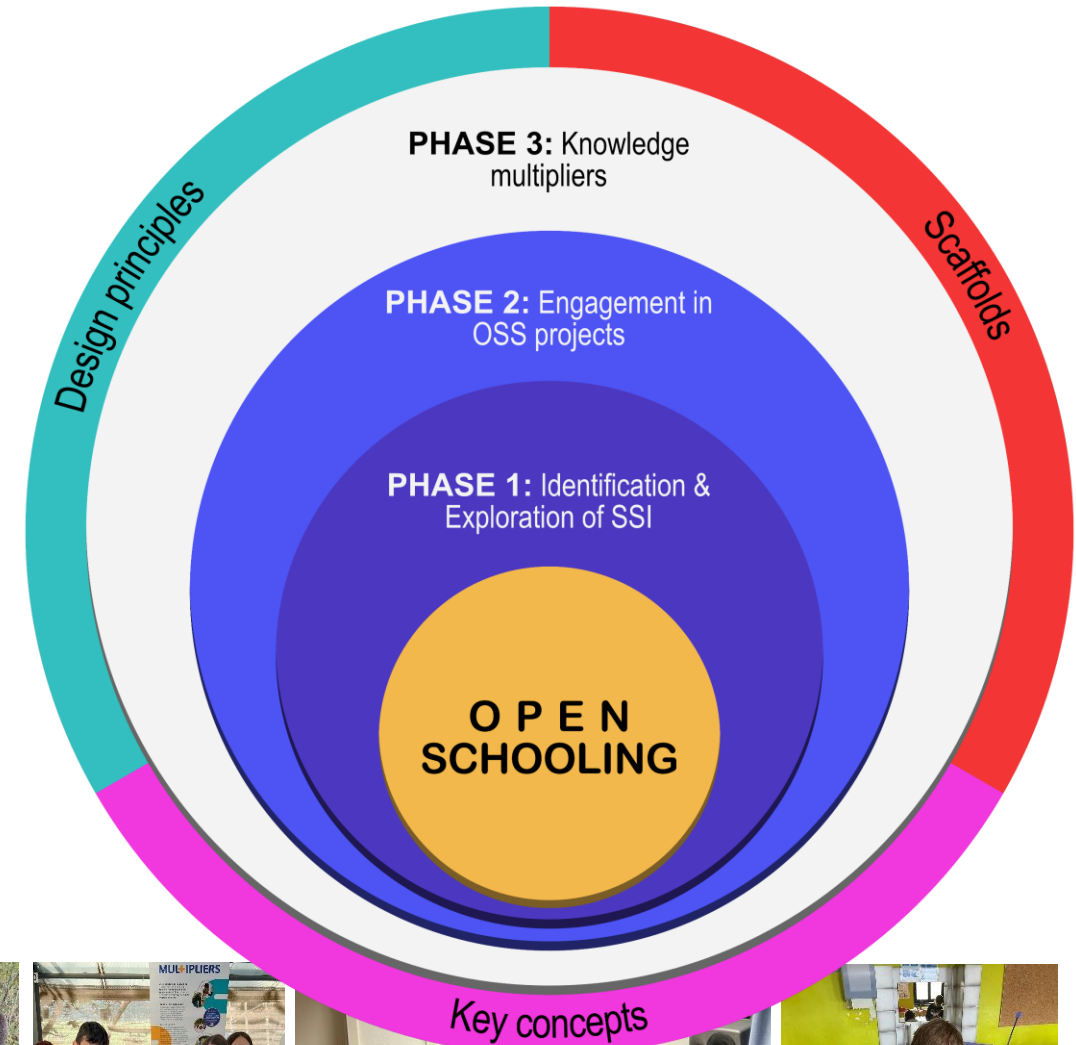
Open Schooling is an educational perspective in which **schools become open to society** by bidirectionally collaborating with different institutions with the aim to:

- a. **Improve community well-being** by raising awareness and co-creating solutions to both personal and socially relevant problems that have a direct impact at a local level.
- b. **Enrich the curricula and pedagogical repertoire of schools**, by sharing different views and expertise from both educational and non-educational agents and institutions with the aim to promote students' meaningful learning and competence development.
- c. **Give epistemic authority to all agents from within and outside of the school**, specifically to the students and their families, by engaging them in sustained inquiry, knowledge creation, creative action, and dissemination on issues of relevance to the local community and beyond.

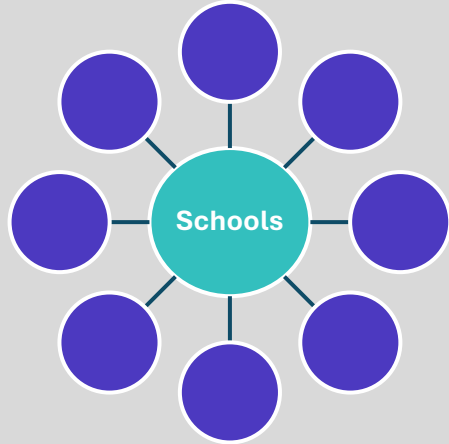
To do so, the projects and initiatives on Open Schooling take advantage of the knowledge, practices, visions, attitudes, resources, and values of all involved agents, empowering them to collectively transform society from a reflective and critical standpoint that focuses on sustainability, equity, social justice, and inclusion.

MULTIPLIERS project

- The MULTIPLIERS common approach
 - **Phase 1.** Identification and exploration of socio-scientific issues (SSIs) of relevance to the local community
 - **Phase 2.** Engagement in the Open-school science learning project (OSS)
 - **Phase 3.** Students acting as multipliers

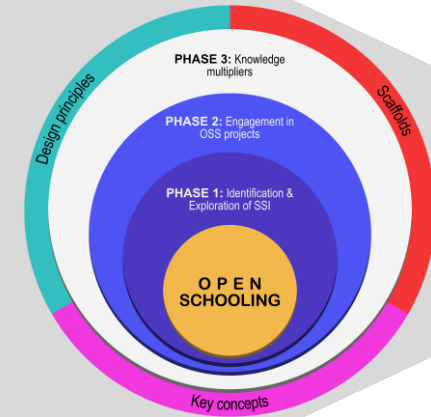


MULTIPLIERS project



Biodiversity & Ecosystem Services

- Science Backpack
- Marteloscope
- Biodiversity and Birds

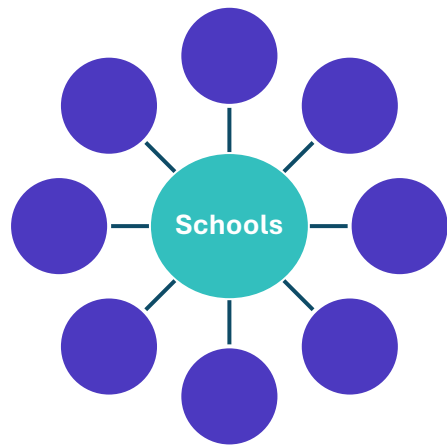


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Science Backpack

- **Phase 1.** Identification and exploration of socio-scientific issues (SSIs) of relevance to the local community



16. Gobe slike

Kaj gobe skrivajo pod svojimi klobuki?

V gozdu poiščite nekaj gob in naberite njihove klobuke. Gobe za en dan postavite na debelejši list papirja črne barve. Naslednji dan odstranite klobuke in si ogledajte vzorce, ki so jih pustili na papirju. Če želite sliko ohraniti, jo lahko poskropite z lakom za lase in tako fiksirate spore na papir.

19. Fitociani - kako dišijo drevesa

Ali veš, da rastline oddajajo vonj?

Rastline tvorijo hlapljive snovi, ki jih ščitijo pred škodljivimi vplivi iz zunanje okolja, kot so vročina, glive in žuželke, lahko pa služijo tudi za komunikacijo z drugimi rastlinami. Običajno te snovi izhlapevajo iz listov ali iglic ter iztekajo skozi rane.

ŠL.	ARTIKEL	OPIS	KOLIČINA
1	lupa	6x povečava	1
2	lupa	10x povečava	1
3	abrika kartic z aktivnostmi		1
4	daljogled	20x povečava	1
5	sortirni pladenj		1
6	večja kadička s pokrovom		1
7	manjša kadička s pokrovom		1
8	vrv	5 m	1
9	šilček		1
10	radirka		1
11	merilni valj	250 ml	1
12	mrežica		1
13	merilni lonček s pokrovom	100 ml	3
14	lonček s pokrovom	100 ml	5
15	lonček s pokrovom	25 ml	5
16	lij		1
17	centrifugirka	25 ml	5
18	centrifugirka	12 ml	5
19	žlica		1
20	žlička		1
21	vilica		1
22	nož		1
23	svinčnik		1
24	ključnato merilo		1
25	lopatica		1
26	cečilo		1
27	večja vrečka na zadrgo		30
28	manjša vrečka na zadrgo		30
29	naravoslovnik		1

VODNA IN VETRNA EROZIJA

Preverite, ali imate, preden odete na oddajo. Če nimate:

NAJEN:

- 4. Katerikolna odprta posoda (plastični ali stekleni) za preverjanje erozije in naklona terena.
- 5. Različni vrste tal (glina, pesek, šot, travnata zemlja).
- 6. Različni vrste rastlin (travnata, goščava, odprta).
- 7. Različni vrste kamenja (veliki, majhni, okrogli, kotli).

OPREMA ZA POSKUS:

PREDAKCIJA:

- 1. Katerikolna odprta posoda (plastični ali stekleni) za preverjanje erozije in naklona terena.
- 2. Različni vrste tal (glina, pesek, šot, travnata zemlja).
- 3. Različni vrste rastlin (travnata, goščava, odprta).
- 4. Različni vrste kamenja (veliki, majhni, okrogli, kotli).

NAJEN ZA DELO:

1. V katerikolno odprto posodo (plastični ali stekleni) za preverjanje erozije in naklona terena, nalijte 100 ml vode.

2. V katerikolno odprto posodo (plastični ali stekleni) za preverjanje erozije in naklona terena, nalijte 100 ml vode.

3. V katerikolno odprto posodo (plastični ali stekleni) za preverjanje erozije in naklona terena, nalijte 100 ml vode.

4. V katerikolno odprto posodo (plastični ali stekleni) za preverjanje erozije in naklona terena, nalijte 100 ml vode.

5. V katerikolno odprto posodo (plastični ali stekleni) za preverjanje erozije in naklona terena, nalijte 100 ml vode.

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17. V katerikolno odprto posodo (plastični ali stekleni) za preverjanje erozije in naklona terena, nalijte 100 ml vode.

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PRED POSKUSOM

PO POSKUSU

špelinice
zavod za izobraževanje
in svetovanje

CASORIS
moj prvi spletni časopis

GOZDARSKI INŠTITUT SLOVENIJE
SLOVIANIAN FORESTRY INSTITUTE

UNIVERZA
V LJUBLJANI

MUL+IPLIERS

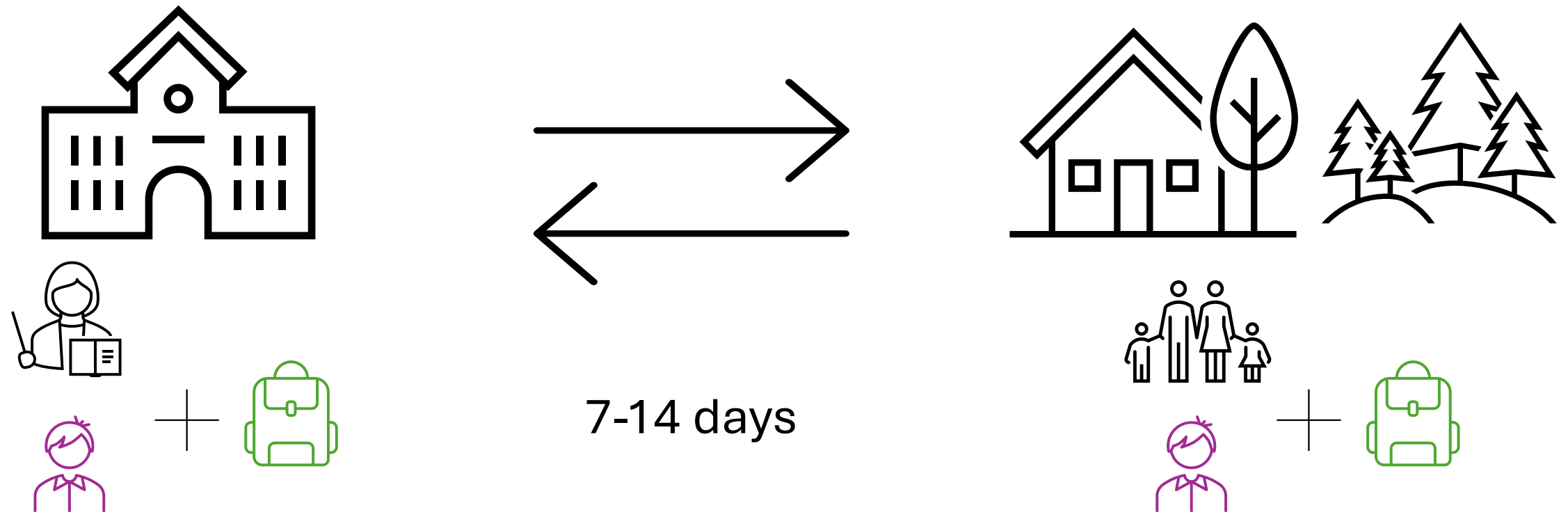
Univerza in Špelinice
Projekt: Mul+Ipliers

MUL+IPLIERS



Science Backpack

- **Phase 2.** Engagement in the Open-school science learning project (OSS)
- **Phase 3.** Students acting as multipliers



MUL+IPLIERS




Science Backpack

- **Phase 2.** Engagement in the Open-school science learning project (OSS)
- **Phase 3.** Students acting as multipliers



ČASORIS

Novice Šport Znanost Zabava Šola svet jaz Za starše in učitelje English Podprite Časoris



Opisovanje rapasa pri ročnih delavcih. Foto: Denisa Blažič/Časoris

S potujočim naravoslovnim nahrbtnikom so otroci raziskovali naravo in živali

Časoris 6. 7. 2023 2 min.

POSLUŠAJ

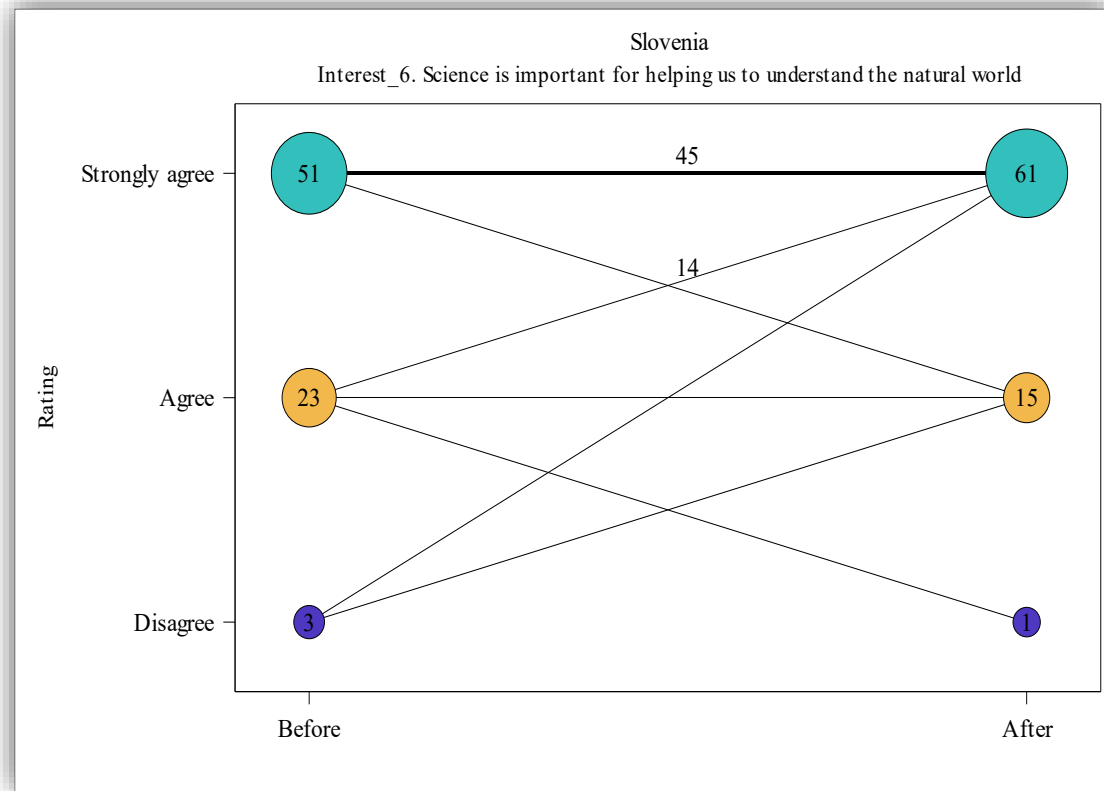
Obiskovalci vrtnarskega krožka na OŠ Spodnja Šiška in učenci učiteljice Žive Škrinjar smo s Pedagoške fakultete dobili naravoslovni nahrbtnik.

Naravoslovni nahrbtnik je potoval od učenca do učenca v okviru projekta **Multipliers**.



MUL+IPLIERS

Science Backpack



1st Round Implementation (N=88)

I think it was nice that we had the opportunity to explore the area on our own with binoculars so that we could focus on the things we liked.
(student)

We were out in the fresh air and in a different environment – that's when you start to think differently.
(student)

I was surprised by the reaction of the parents. The school's parents' council even wrote me a letter and gave me an award for taking time with their children.
(expert)

They are asking different questions, thinking about their lives at home, making connections.
(teacher)

MUL+IPLIERS

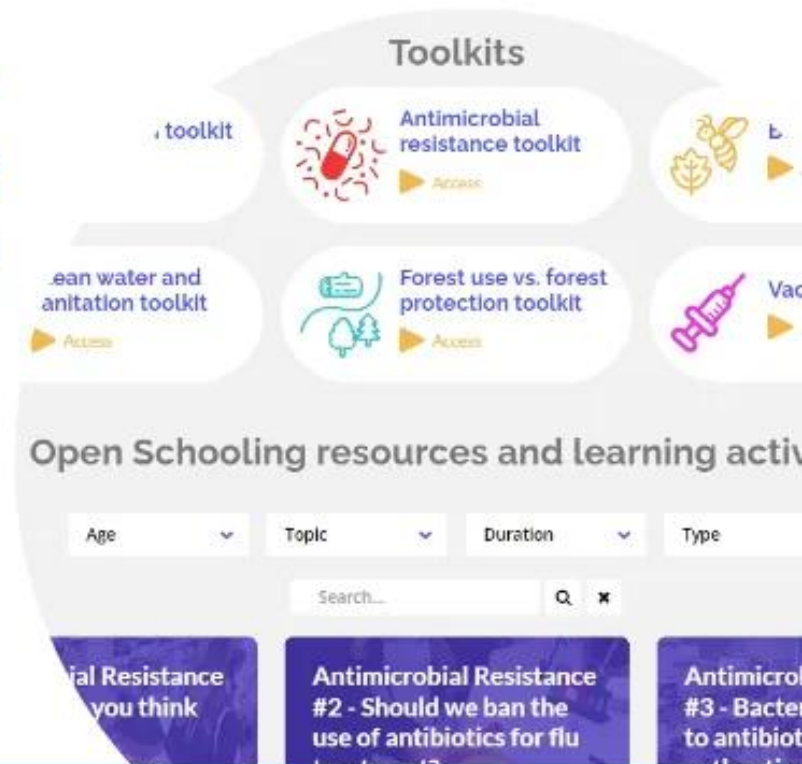


- Recommendations for successful open-schooling activities (‘Whitebook’) and policy briefs.
- Open schooling projects on different SSIs are available on our website:

A new platform for science educators exploring complex socio-scientific issues in and out of the classroom



E-mail: gregor.torkar@pef.uni-lj.si



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Policy Brief 1 - October 2024

How can an operational definition of Open Schooling help us in transforming society?

Authors: MULTIPLIERS consortium

Modern societies are confronted with complex challenges, such as environmental protection and the promotion of healthy living. However, trust in scientific findings is declining – an urgent issue of our time. MULTIPLIERS has set an ambitious goal to reverse this trend by addressing the problem at its roots, using the concept of Open Schooling as its guiding framework. This document outlines the project's objectives and provides a first overview of our operational definition of Open Schooling.

The MULTIPLIERS project, building on the strengths of an international consortium consisting of eight Beneficiaries, aims to initiate a process that helps schools transition into innovative hubs for new ideas, practices, and scientific approaches. The project seeks to create spaces within the curriculum where the beneficiaries spend learning open, inclusive, and inquiry-based.

Open Schooling is an educational perspective in which schools become open to society by bidirectionally collaborating with different institutions with the aim to:

- Improve community well-being by raising awareness and co-creating solutions to both personal and socially relevant problems that have a direct impact at a local level.
- Enrich the curricula and pedagogical practices of schools, by sharing different views and expertise from both educational and non-educational agents and institutions with the aim to promote students' meaningful learning and competence development.
- Give external authority to all agents from within and outside of the school, specifically to the students and their families, by engaging them in sustained inquiry, knowledge creation, creative action, and dissemination on issues of relevance to the local community and beyond.

In doing so, the project and initiatives on Open Schooling take advantage of the knowledge, practices, values, attitudes, resources, and values of all involved agents, empowering them to collectively transform society from a reflective and critical standpoint that focuses on sustainability, equity, social justice, and inclusion.



Policy Brief 2 - October 2024

Making school science relevant to real-world challenges through Open Schooling Science Learning projects

Authors: MULTIPLIERS consortium

The MULTIPLIERS project aims to expand opportunities for science learning by fostering collaboration between students, schools, families, local communities, civil society organizations, informal learning providers, universities, the media, policy makers and industry. Here we provide information on how in Open Science Communities (OSCs) that have been established in the project countries—Germany, Cyprus, Spain, Slovakia, Sweden and Italy collaboration and authentic science learning can be fostered. [Open Science](#), the European sustainability competence framework, published in 2022, highlights the importance of encouraging learners to act at individual and collective level to shape sustainable futures. This demands teachers, schools and policy makers to make change happen. A plethora of stakeholders at local level must work together to shape and achieve global transformations for a more sustainable planet. OSCs provide local communities with a space for open, inclusive and inquiry based learning on sustainability that have an impact on citizens' lives.

The MULTIPLIERS project offers a practical definition of Open Schooling for use in most phases of the project. In light of the above, we propose an Open Schooling approach that integrates three key objectives—community impact, pedagogical impact and scientific impact—while explicitly highlighting core values.

In each OSC, open-schooling science (OSS) learning projects were developed collaboratively with science professionals in long real-life cases to the students regarding contemporary challenges/ socio-scientific issues. Students collaborated

with several stakeholders to explore different perspectives and improve their understanding while being involved in scientific practices (e.g. problem-based activities, collecting and analyzing data, modeling, argumentation), having gained first-hand experiences and an insight into inquiry-oriented practices in authentic learning environments. Students became knowledge multipliers; they presented and shared their knowledge and experiences in multiple activities by actively involving their families and the wider community, through dedicated local events (e.g., open-schooling action days, citizen science activities), and through designing and exploiting science communication media (e.g., exhibitions, social media channels, and video clips).

Hundreds of students and teachers took part in science learning projects, including exploring ecosystems with our natural science landscape in Slovenia, monitoring air pollution data in Spain, raising awareness about Antimicrobial Resistance in Cyprus, debating how to influence political decisions about forests in Sweden, discussing ethical aspects of vaccination in Germany, and conducting a blind taste test in Italy.

MULTIPLIERS Open Schooling Science Learning Framework

The different phases of MULTIPLIERS Teaching and Learning sequence

The framework systematically coded conceptualization of Open Schooling guided the formulation of the framework consisting of design principles for developing and enacting a Teaching and Learning Sequence (TLS). The MULTIPLIERS framework evolves in three phases as follows:



Policy Brief 3 - October 2024

Open Schooling Science learning projects foster students' interest in science, ownership of their learning and science career awareness

Authors: MULTIPLIERS consortium

The MULTIPLIERS project builds on the strengths of an international consortium of eight beneficiaries and aims to initiate a process that helps schools to transform themselves into innovative hubs for new ideas, practices and scientific approaches. The project aims to create spaces in the curriculum where the beneficiaries promote open, inclusive and inquiry based learning on complex socio-scientific issues that impact citizens' daily lives. This has been achieved by establishing partnerships ("Open Science Communities") that bring together schools, families, civil society organizations, informal education providers, policymakers, media, industry and a wide range of scientific institutions across six diverse EU countries— Cyprus, Germany, Italy, Slovakia, Spain and Sweden—each with different geographical and economic contexts.

The aim of the MULTIPLIERS project was to evaluate implemented methodologies and approaches. The policy brief summarizes the main outcomes of two implementation phases based on the MULTIPLIERS common approach described in Policy Brief 2. In this sense, the policy brief describes the main results, successful methodologies and approaches gained from the MULTIPLIERS educational activities to foster students' interest, ownership and career awareness in science for all participating countries. Fostering interest in science careers among young people is a growing problem. Interest in STEM careers declines with age, with motivation to pursue such careers influenced by factors such as interest, joy and the variety of career opportunities. Conversely, the benefits to STEM careers are often lost of interest or alternative career plans. The analysis of OECD results from PISA shows that students perform better in science when teachers use strategies such as teacher support or inquiry based learning. This is also reflected in career decisions, as students' future expectations in science are positively related to their performance and enjoyment of the subject (OECD).

Interest in science
The MULTIPLIERS project has identified several successful methodologies and approaches for fostering students' interest in science by experiencing and engaging in scientific activities conducted at the OSC-partner sites. Key findings show that the



Students showed interest in science:

"I definitely recommend it, it was a lot of fun, and I've got completely different from a regular lesson" (Student, Germany)

"The visit professional lab where scientist are working is something that students usually remember when going into university" (Student, Spain)

"The students found the research very exciting and they asked if we could use their input in our name of their research" (Teacher, Sweden)

"Usually there are a few girls who never participated in the OSC activities and applied their own ideas, applying biology, most of them contributed with their ideas" (Teacher, Cyprus)

Policy Brief 4 - October 2024

Building and Sustaining Open Schooling Networks: Ensuring Long-term Impact of Collaborative Science Education

Authors: MULTIPLIERS consortium

The EU Horizon 2020 project MULTIPLIERS aims to improve science learning by fostering collaboration among students, schools, families, local communities, civil society organizations, informal learning providers, universities, the media, policymakers, and industry. To achieve this, the project transformed educational settings into Innovative Open Schooling Communities (IOSCs). MULTIPLIERS has established OSCs across six EU countries, promoting partnerships between schools, society, and scientific institutions. These networks have successfully addressed socio-scientific issues and increased students' engagement with science.

As the project advances, sustaining these networks becomes a new priority. This policy brief highlights key strategies for policymakers and educators to maintain and expand open schooling initiatives. Based on extensive research and experience, MULTIPLIERS developed a sustainability model offering a roadmap for

- Communication:** Establishing clear channels for information sharing. This encompasses a range of strategies and innovations designed to foster engagement, collaboration, and inclusivity among all stakeholders involved in the project and beyond.
- Coordination:** Ensuring effective management of partnerships and resources. In addition to formal organizations, the composition of the network and the diverse needs of the individual partners have to be considered to foster strong partnerships.
- Cooperation:** Implementing co-leadership instead through mediated operations, shared resources, and shared collaboration. This involves mutual support and shared responsibility of partners.
- Costs:** Addressing financial sustainability through various funding mechanisms. This comprises both external financial support and internal funding opportunities.
- Collection of Materials:** Developing and maintaining a repository of resources and best practices. This includes providing accessible, relevant, and customizable educational materials, along with ongoing support for educators.



Resources

Coombs, P. H., & Ahmed, M. (1974). *Attacking Rural Poverty: How Nonformal Education Can Help*. A Research Report for the World Bank Prepared by the International Council for Educational Development.

European Commission (2010) *EUROPE 2020: A strategy for smart, sustainable and inclusive growth*, COM (2010)2020, European Commission.

European Commission, Directorate-General for Research and Innovation, *Science education for responsible citizenship: report to the European Commission of the expert group on science education*, Publications Office, 2015, <https://data.europa.eu/doi/10.2777/13004>

Fordham, P. E. (1993). *Informal, non-formal and formal education programmes*. YMCA George Williams College ICE301 lifelong learning unit, 2.

Giddens, A. (2002) *Runaway world: How globalisation is reshaping our lives*. Profile books.

Lemos, M. C., Kirchhoff, C. J., & Ramprasad, V. (2012). *Narrowing the climate information usability gap*. *Nature climate change*, 2(11), 789-794.

Organisation for Economic Co-operation and Development. (2016). *PISA 2015 results: Excellence and equity in education*. Oecd.

Owen, R., Macnaghten, P., & Stilgoe, J. (2020). *Responsible research and innovation: From science in society to science for society, with society*. In *Emerging Technologies* (pp. 117-126). Routledge.

Tsai, C. (2014). *The Case for Social Innovation Micro Credentials*, Stanford Social Innovation Review Blog. http://www.ssireview.org/blog/entry/the_case_for_social_innovation_micro_credentials