OPEN SCIENCE HUB

EMPOWERING CITIZENS THROUGH STEAM EDUCATION WITH OPEN SCHOOLING

(Preliminary) OSHub Vision and Value Propositions

A summary

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Acknowledgement

OSHub has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 824581

More information in *Deliverable 7.1 Vision and Value Proposition for OSHubs*

IMPACT HUB Siracusa

OPEN SCIENCE HUB

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CANVAS

FOR OPEN SCIENCE HUB

PROJECT TITLE: _____

Designed by (author, working group): _____

Date: _____

VALUE PROPOSITION

· What is the specific proposal of this initiative?
· Can the initiative actually ameliorate the quality of life of people and the environment?
· How can the value proposition become a fully realised and actionable solution for society and the environment?

PROBLEM/NEEDS/ OPPORTUNITY

· What is the main challenge that the initiative aims to address?
· Which of the UN Sustainable Development Goals does this challenge refer to?

RESULTS

· Which concrete and measurable results (outcomes) will be produced by the initiative?
· Which specific social or environmental challenges will be addressed?

ACTIVITIES

· What activities are required to produce the results for the initiative?

RESOURCES

· What types of resource will you need to kick off the initiative?
· What types of resource could you need to complete the initiative?

EXTERNAL CONDITIONS

· What external factors could positively or negatively affect the results of the initiative?

IMPACT

· What is it?
· How is it measured?
· What kind of social impact?
· What environmental impact?

SIDE EFFECTS

· What are the potential unintentional results (positive or negative) that could develop during the course of the initiative?

ACTORS

· Beneficiaries / Users
· Partners / Collaborators / Providers
· Other actors and influencers

KEY OBSTACLES

What barriers or obstacles stand between the actors and their full involvement in the initiative?

RELATIONS AND CHANNELS

· What relationship and what channels are put in place to involve and engage the various actors?

COST STRUCTURE

· What categories of costs and investments are needed?
· What is their extent?

FLOW OF REVENUES

· How are the necessary resources generated?
· What is the economic engine of the initiative?
· Who provides the financial support to maintain or grow the initiative?

Source: elaboration based on references on the logical framework **www.logframer.eu** and on the business model canvas **www.businessmodelgeneration.com** including additional versions proposed by Danielle Olson and others.

☐ Profit ☐ No profit ☐ Hybrid ☐ Other_____

Powered by ENISIE project

Red Box:

Results, Activities, Resources

Table 1: Red box synoptic table.

	RESULTS/ CHALLENGES	ACTIVITIES	RESOURCES
AE	1) Fostered digital literacy within school students in the Upper Austria region; 2) Fostered transdisciplinary thinking in young people between the age of 11-18; **Challenges:** Lack of digital expertise; Technological literacy in non-urban regions of Austria	– Meeting with head teachers of an initial selection of 10 schools in the region to discuss whether they would be interested in implementing the program and within which curricula; – Approaching artists who have participated in the AE festival that are working in subjects related to the desired curricula and requesting them to host a workshop; – Hosting a training session with each selected artist that is led by an AE educator; – Hosting the selected artist led one-day workshops within the selected classes of the selected schools. Assessing the success of the workshops with a teacher survey and the selected Digital Literacy assessment tool for the participating students	**Human:** – Project manager – Artists to host the workshop **Material:** – Materials and tools required for each workshop (diverse and specific to each type of workshop)
CCSTI	1) Improved autonomy and willingness of using OSHub resources, number of OSHub driven projects; 2) OSHub Fab Lab designed, made with teachers, educators; 3) Promoted "the well-being together" with projects involving wide range of partners; **Challenges:** School failure; socio-economic local issues	– Develop the program with the local stakeholders and the management board: meet and exchange to develop active collaboration; – Teacher trainings provided by education partners; – Workshops to create kits and resources using the potential of the OSHub project; – Meetings with the locals to identify projects and brainstorm solutions; – Benchmark the opportunities of financing the projects : Foundations, french calls, etc.	**Human:** – Project leader – Fab facilitator La Casemate – La Machinerie experts **Material:** – Consumables – PC – DIY Furniture

FAB

1) Built relationships between Onl'fait, 3-10 secondary schools in the Geneva region (vocational schools and colléges) and 3-10 other community stakeholders (universities and policy makers)

2) Increased student awareness of the scientific and technical local issues

3) Increased scientific and technological literacy of the weakest students

4) Furnished about 30 square metres of our Fab Lab

5) Increased role of the Fab Lab among the actors of science and technology education in the Geneva region

Challenges: Local environmental and societal

- Teacher consultations each year of the Open Science Hub programme. These activities take the form of co-creation sessions.
- Stakeholders co-creation consultation each year of the Open Science Hub programme. These activities take the form of co-creation sessions.
- Design and develop working prototypes for increasing scientific and technological literacy.
- Collect and analyse data for competency building with respect to societal and environmental issues to 3 to 10 schools.
- During and at the end of each sprint, put in place evaluation tools to help us, students and schools to evaluate the quality of the programme and its outcomes.
- Disseminate the results of the school initiative and promote Open School at cantonal and national level.
- Development of relationships between vocational schools and relevant stakeholders.
- Development of a formal educational program grounded on concrete research questions related to the territory.
- Work with students and Glitter (Precious Plastic Geneva)

Human:

- Experts
- Researchers
- Local Mang. Board
- Fab: Coordinator, facilitator, electronic exp.

Material:

- Tools to build prototypes
- Computers
- promotional materials

MFCR

1) Promoted the use of OS approaches by teachers;

2) Fostered students' active citizenship;

3) Promoted the collaboration between partners and schools;

4) Increased the connectedness between students and R&I professionals/artists/ entrepreneurs;

5) Increased student and teacher digital literacy and autonomy in using digital tools/platforms

Challenges: Social and Environmental

- Capacitation of teachers and school heads on OS via: a certified continuous training program for local and regional schools, organization and facilitation of OS project follow-up sessions for teachers;
- Development of a formal/non-formal educational program grounded on concrete research questions related to the territory, based on research and citizen-science practices, co-created with teachers from the school science club;
- Development of a program aimed at increasing the connection between students and professionals from research and innovation / artists / entrepreneurs.

Human:

- 1 program coordinator (1 FTE) and team members
- 1 program coordinator from the school
- 1 representative from a teacher training center

Material:

- a physical space/ room;
- computers;
- internet connection;
- digitaltools/ platforms

SCICO	1) Created tangible projects that address real issues in the community of Lemnos 2) Created a live network between school and local stakeholders; 3) Increased student and teacher engagement in STEM education; 4) Increase student awareness on SDGs and environmental issues in Lemnos. **Challenges:** Environmental, educational, social, technological (SDGs 4, 12, 13, 14, 15)	– Design an Educational curriculum (Arduino, App Inventor, 3DPrinting) which will give school necessary knowledge to create projects; – Run educational workshops on a weekly basis to teach curriculum – Co-creation activities twice a year to identify issues/related activities – Issue open call for potential project partners – Hold regular sessions/meetings to drive collaboration, design new ideas/projects, etc and common event to share results with everyone present – Run a workshop on the SDGs – Hold 1 or 2 training events for teachers involved	**Human:** – Project manager – STEM educators **Material:** – Platform for online meetings – 3D printer, Arduinos, sensors, etc
SCIN	1) 5 local OSHubs (three schools, two NGOs established; 2) Established school-led form of education which is engaging students, teachers, parents and various local actors for knowledge-based community development 3) Tackled environmental, historical, cultural, socio-economic issues faced by local communities 4) Built relationships and networks among different levels of stakeholders concerned with sustainable development of local communities **Challenges:** Environmental	– Training for kids in use of technologies needed for production of TV series, while putting the kids in the role of actual team shooting a documentary on a popular topic(s). – App editor for OSHub's use (creation of geolocated iOS and Android mobile app, which can be used for connecting any physical location via online map with any historical/social/environmental online content). – Training for children focused on using the prepared App creator. – Educational program on air quality involving citizens – Shooting of educational series co-produced by Czech Television (channel for designated for kids) about engagement of kids in scientific exploratory activities	**Human:** – Local coordinators – National coordinator – Technical staff – Trainers **Material:** – Physical premises for 5 OSHubs (use of already existing ones) – Posters, leaflets, etc. – IT equipment (two notebooks, go-pro, 3D printer, etc).

TCD

1) Built relationships between Science Gallery/ TCD,) schools and other community stakeholders;

2) Increased student awareness of their potential to effect change in society with respect to active global citizenship;

3) Motivated students who identify with local challenges with respect to the UNs Sustainable Development Goals.

4) Useful frameworks and facilitation guidance for schools to replicate and lead the Open Science Hub program

Challenges: Climate change/ pollution, discrimination, coronavirus impacts, poverty

- Teacher consultations at the beginning of each year of the Open Science Hub programme. These activities take the form of co-creation and/or focus groups.
- Development of a year-long Transition Year curriculum including competency building and student-led project builds.
- Develop and deliver a set of workshop activities for competency building with respect to active global citizenship to three schools over two years.
- Experimentation with tools and resources to create a well of activity types to suit students and teachers. Particular focus on tools that can work in a remote learning setting.
- Prototyping of online, hands-on STEAM workshops with a youth audience (15-25s)
- Development and dissemination of teacher packs that enable schools to facilitate the Open Science Hub programme, not bound to the Dublin area with less regular engagement with Science Gallery/ TCD.
- Teacher training at the start of year 3 for the Open Science Hub curriculum, tools and stakeholder management.

Human:

- Community champions
- Facilitators
- Researchers

Material:

- Craft, handouts
- online materials (Mural, Mentimeter, Google classrooms etc)

ULEI

1) Improved the well-being for primary school teachers and students

2) Increased educational opportunities of primary school student

3) Increased number of societal experiences for uni students

4) Improved attitude of uni students towards a career in education

Challenges: Social and Collaboration

- Develop a programme that matches (2) university students to schools
- Set up a training programme together with several partner from Leiden University and the primary schools to train uni students on basic didactic, pedagogical and professional knowledge and skills
- Set up research to visualize the effects of the project to understand the impact of the project and to build a case for future funding
- Set up a sustainable plan for the future of the project, by looking for future financial opportunities and potential collaborations (for example campus The Hague, schoolboards)

Human:

- Scientific experts
- Uni Students
- Project coordinator

Material:

- Laptop
- Teams
- Website
- Catering

Yellow Box:
Actors, Key Obstacles, Relations and Channels

Table 2: Yellow box synoptic table.

	ACTORS	KEY OBSTACLES	RELATIONS & CHANNELS
AE	**Beneficiaries:** Students, teachers, artists **Other:** Local school boards, the Ministry for Education, Industries	– Covid-19: Travel restrictions limited the possibility to have hands-on technology workshops and meetings in presence at the Ars Electronica Center, preventing the use of the collection of interactive art and maker tools to incentivise different groups to work together outside of their normal networks.	– Ars Electronica Festival – Conference calls – Open house sessions
CCSTI	**Beneficiaries:** Teachers, Students, Inhabitants **Other:** La Machinerie, school directors and inspectors, education trainers, Grenoble Alpes University	– Teachers: difficulty to understand the potential of the project and of a collaboration with a FabLab; Lack of time – Students: a lot of difficulties affect students caused by social problems within the families, Also, violence is increasing in the area, so the kids are stressed by this bad atmosphere. – Covid-19	– Meetings at the new OSHub (La Machinerie) – Opend days
FAB	**Beneficiaries:** Secondary schools in Geneva, The Canton (regional government), La Maison de la Rivière, FAB **Other:** Post Tenebras Lab, Musée d'Histoire Naturelle de Genève, Syndicat des jeunes, Office Cantonal de l'eau	– Teachers: the impossibility of in-person meetings make them not fully engaged in the project. Organizational issues with their school is also an obstacle. – Students: Little engagement due to non-physical gatherings. – DIP: No participation because of the COVID crisis even though they are very interested. – Community: The impossibility of in-person meetings makes it hard to fully engage in the project. – Covid-19	– Contact the stakeholder via email or telephone – Send a dossier to stakeholder – Organise a meeting or call – Follow-up to keep the relationship solid

MFCR	**Beneficiaries:** School-heads and teachers, high school students **Other:** Municipality, University, Parents' and Students Associations, Teacher training Center, firefighters, professionals from R&I / artists / entrepreneurs.	– Teachers: lack of knowledge on IT/digital platforms can make them not engage in the training course. Due to a lack of an holistic approach to education in general, teachers find it very hard to implement OS projects and use OS approach/methods/tools. Time constraints. implementing Open Schooling projects with primary students has been a challenge as it requires the use of tools that fit this age interval. – Students: lack of knowledge on the use of IT equipments and digital platforms. Lack of motivation for students to participate in school activities and is very hard to engage them outside the school period in activities – Local community: Low participation due to the lack of interest from the local community to engage in active citizenship projects that address local challenges. – Covid-19	– Direct access to members of school boards and different stakeholders and beneficiaries – Zoom meetings, phone, email, face-to-face contact – Social media (e.g. Facebook, Instagram)
SCICO	**Beneficiaries:** Secondary students, teachers **Other:** Dep. of Food Science and Nutrition of the University of The Aegean, municipality of Lemnos, parents association, local businesses and enterprises, local NGO	– The municipality: lack of time and dedication – Teachers: lose their motivation as the project offer doesn't give them tangible incentives and is based on their own willingness and motivation to spend extra time out of school – Students: can't easily stay longer hours after school because there is no later bus to take them home – A lack of trust between stakeholders – -Covid-19	– Meetings – Press Conf. – Viber group
SCIN	**Beneficiaries:** Teachers, students, parents **Other:** Local policy makers, activists, scientists, artists	– School: separation of formal and informal education, which poses the biggest barrier between actors – Budget: schools do not operate with sufficient budgets to boost more open-schooling-focused activities, while the OSHubs do not carry sufficient budgets to overcome this barrier – Covid-19	– Direct access to actors and stakeholders
TCD	**Beneficiaries:** Schools (Students and teachers), Local communities **Other:** Academia, industry, charities, NGOs, artists, local councillors	– Schools and local communities: schedule meetings and motivating students with limited hands-on opportunities and digital settings. Also our approach to the Open Science Hub programme is a year-long engagement and it can be challenging to communicate to students that results or outputs will not come quickly and what they are doing across the months is interlinked and contributes to their final project outcomes. – All actors: Management of time, Resource management, Sustained long term commitment – Covid-19	– Meetings – Weekly phone check-ins with teachers – Quarterly teacher review – Student mentimeter surveys – Student zine reviews – Ideation session – E-newsletter

ULEI

Beneficiaries: Primary schools, with their teachers, students and school heads, University/ Applied science school students

Other: Policy makers, experts

– Hierarchy. Regarding the influencers, it is quite time intensive to meet with them.
– Trust. There is this invisible barrier of mistrust between Leiden University and The Hague. It might be due to the lack of knowledge about the other organisations and what they do.
– Sensitive procedure. Especially by embedding this project in the different councils in the Hague is time consuming
– Funding, there are some conflicting interests between the partners.
– Covid-19

– Students meeting and training session
– Interviews
– Meetins
– Policy paper
– Action plan

Violet Box:
the Value Proposition

Table: Violet box synoptic table.

	VALUE PROPOSITION	PROBLEM/NEEDS/OPPORTUNITY
AE	– To increase digital skills and promote critical and creative thinking in young people aged 11-18 by inviting artists working with technology to lead workshops in schools. By introducing artists and their methods of thinking when working with technologies we can promote critical understanding of technology in young people. This can lead to a human-centred digital society that can critically reflect will ameliorate the quality of life of people and their environment. **How:** The establishment of Ars Electronica as an ongoing facilitator that can offer not only this service and but continue to nurture a sustainable network of schools and teachers is how this could be realized.	**Problems/Needs:** – Equipped artists with skills in knowledge-transfer to develop workshops based on their practices. – Connecting and communicating with individual teachers – Establishing a sustainable funding model so that the program can avoid a stop-start **SDG 4, SDG 9** **Opportunity:** In facing the challenge of uncertainty of COVID we have seen the problem of hosting workshops on-site in school as an opportunity to develop new skills in hosting workshops online. This has become an opportunity in increasing reach and accessibility of the initiative.

CCSTI

– Support and help teachers to develop new projects using the OSHub ressources and increase the number of projects making tangible objects.

Projects will help students to develop their knowledge, their feeling of being an active part in the community.

How: Capacitate teachers and stakeholders with fabrication skills that will allow them to prototype in the Fab Lab. We will also promote connections and collaborations between local partners and schools.

Problems/Needs:

– Social and economic difficulties increased by the pandemic.
– Surge of violence

SDG 4, SDG 10

Opportunity: Teachers are willing to continue doing projects with the students, and they see OSHub as a good opportunity to be helped. Plus, the government has labeled the area "Cité Educative" and this will bring funding for education projects.

FAB

– Offering a methodology and practical tools to place schools at the center of community projects about sustainability, science and technologies by providing support to teachers and students.

Scientific and technology literacy, community engagement, collecting data about the environment are key factors to ameliorate the life of people and the relationship with the community and the environment.

How: The physical Open Science Hub located at the Fab Lab will become a pole for knowledge exchange, teacher training and schools' programs that will make the project sustainable over the next years.

Problems/Needs:

– Creating a platform easy enough to be used by all actors
– Students who are less motivated and interested in science and technology.
– Overcome Covid limits

SDG4, SDG 6, SDG 11, SDG 14

Opportunity: Learning to use tools like Mural to facilitate sessions and alternate remote and live sessions.

MFCR

– OSHub-PT/Plat. de Escola Aberta supports and works together with schools in the co-creation and integration of relevant and sustainable strategies that promote the development of active citizens in addressing local challenges, through research and innovation projects in collaboration with relevant actors.

OSHub-PT wants students to feel that they are and want to be agents of change, and that they have the tools to take informed decisions and actions. Additionally, students are hubs and drivers for collaboration in their communities, via their families, friends and social networks, and as such have a great potential to achieve a wide impact, with repercussions in the quality of life of individuals and the community, as well as in the environment.

How: Capacitating students / teachers / stakeholders with skills that will allow them to address local challenges and use the scientific methods autonomously; promoting a strong connection and collaboration between partners

Problems/Needs:

– Lack of autonomy and confidence of teachers in handling with OS approaches and integrating them in their curricular practice
– Lack of active citizenship and low collaboration between partners and school
– Lack of connectedness between students and research & innovation
– Low digital literacy of students and teachers

SDG 4, SDG 5. SDG 6, SDG10, SDG 11, SDG 12, SDG13, SDG15, SDG 17

Opportunity: Close professional relationship with teachers at an intermediate decision-making level, allowing for co-creation/co-development (in formal and non-formal contexts). Improve the distance learning, through capacitation of teachers/ students in digital platforms/tools integrated with curricular needs. Drinkable Rivers existing project and their kits (for monitoring water pollution).

SCICO

– SciCo Maker Lab aims at supporting and working together with the educational community (schools, educators, students) in order to enhance STEM education and hands-on learning.

By turning to more inclusive and hands-on teaching approaches, students are more motivated and show agency through having a voice, a choice and ownership of their actions in the local community.

How: A necessary step is to go from a pilot project to a larger scale, including more schools, teachers and stakeholders. Through a train-the--trainer model, the knowledge and skills acquired remain in the community and can be transferred to the next school years and generations by the students. The co-creation methodology and the active involvement of multiple stakeholders will keep the focus on real and relevant challenges which will need actionable solutions and have an inner drive.

Problems/Needs:

– Drive student and teacher motivation and digital literacy
– Move to a more student-centered educational approach through hands-on learning
– Equip teachers and schools with necessary resources
– Connect school subjects and learning to the real world
– Drive transdisciplinary learning and collaboration
– Connect the school with local stakeholders and the broader community

SDG 4, SDG12, SDG 13, SDG14, SDG15

SCIN

—

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TCD

– Promoting trans-disciplinarity and active global citizenship with Transition Year (TY) students through a TY module that can be sustainably delivered in secondary schools year on year. Additionally, providing or pooling networks of stakeholders that can help build student action out into local communities and vice-versa.

How: Transforming learning (Alternative / Contemporary learning approaches) Pilot > Forum > Training wheels off > Review

Problems/Needs:

– Division of school subjects from the perspective of students
– Divisions between school organisations and local communities. This involves exploring trans-disciplinarity, the impact of various topics across STEAM on society, and the empowerment of young people to become leaders within their communities and further afield.

SDG 4

Opportunity: Exploring transdisciplinarity, and the impact of various topics across STEAM on society, that can empower young people to become leaders within their communities and further afield.

– By matching University students to primary schools, we are opening up schools to different members in the community and by this help them overcome academic, emotional and creative lag and challenges.

Offering meaningful and relevant societal and educational experiences to the actors in the project and by this, improving career opportunities and decreasing loneliness and anxiety for university students.

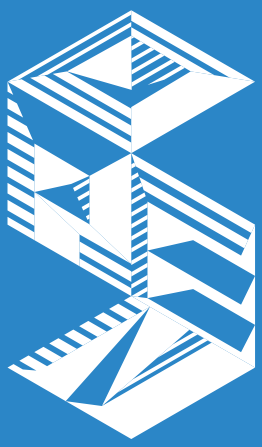
How: By recruiting, training and matching University students to schools, to offer tailored support tuned to the specific needs and challenges of each school. By offering the university students a side job and relevant training in primary school education, to give them a valuable societal experience. On top of that, by carefully assessing where the support of students is most needed and by providing extra support to the children who need it the most, pressure is released on the teacher workload, leaving teachers with more time to carry out their regular duties.

Problems/Needs:

– Social/economic disadvantaged neighbourhoods in The Hague are facing severe problems due to corona.
– Increased workload due to Teacher shortage and pupils are falling behind in their academic, creative and emotional development.
– Quality education for all primary school children in The Hague and extra support for teachers.

SDG 4

Opportunity: University students have time and energy to help the schools, Governmental financial support (social economic recovery plan) and Schools are more eager to open up to external support.



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