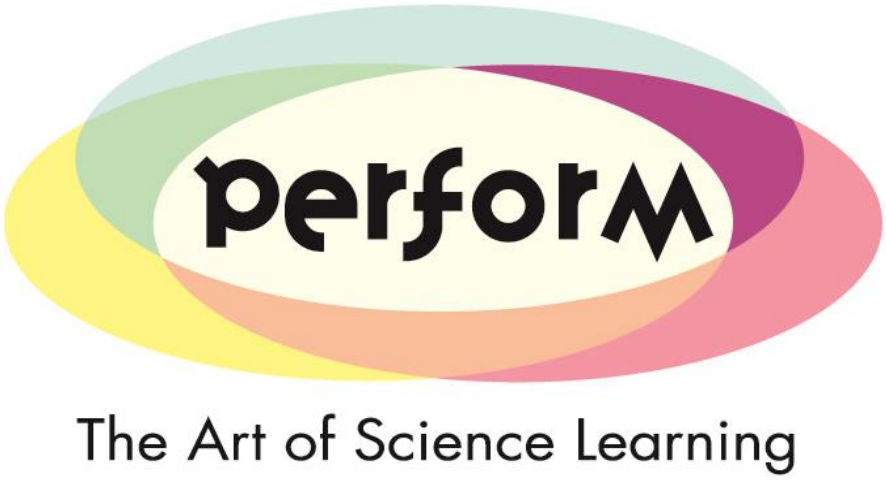

The Art of Science Learning

D5.1

Sustainability plan

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UNESCO

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European Science Events Association
Universitat Oberta de Catalunya
Science Made Simple

PERFORM
Participatory Engagement with Scientific and Technological Research through Performance

CONTENTS

SUMMARY

This document highlights the main actions to be undertaken by the PERFORM project's consortium in order to ensure the sustainability of the project and its findings after the end of the project in October 2018. This deliverable thus corresponds to Task 5.1 "Sustainability Plan", led by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The present document has been drafted having in mind the following EU's definition of a project sustainability plan: "a project is sustainable when it continues to deliver benefits to the project beneficiaries and/or other constituencies for an extended period after the Commission's financial assistance has been terminated"[1].

Three axes have been identified to ensure the sustainability of PERFORM. First of all, the findings of the project (PERSEIAs and Toolkits) are the solid basis toward the sustainability of PERFORM. Second, the variety of partners and networks including policy and decision makers are also the keys to ensure the long last of the project. Finally, the legacy of the PERFORM project will be assured by a proactive consortium and stable funding sources that will allow the project to expand in Europe and beyond.

[1] European Commission Directorate-General Education and Culture (2006) "Sustainability of international cooperation projects in the field of higher education and vocational training - Handbook on Sustainability". Luxembourg: Office for Official Publications of the European Communities, ISBN: 92-9157-

1. INTRODUCTION

The world is facing a global crisis in science education, as seen by diminishing number of youngsters interested in studying science, technology, engineering and mathematics (STEM). Since 2000, studies made clear that there is an alarming crisis in relation to students' interest in science as a possible future career or as an intrinsic interest to continue after school.[2] The list of countries that have recorded concern about this matter is now very long, especially among the more developed ones.[3] In Europe a considerable percentage of young people are not interested in STEM careers mainly because they perceive science as boring and difficult, and they feel they lack the necessary skills to deal with such topics. Such negative perceptions discourage adolescents from actively seeking to learn about science, explore career options in STEM fields, and undervalue the role of science in society.[4]

STEM education addressed from the perspective of creativity and innovation has the power to transform how we live. It can enhance the quality of life and life expectancy. It can provide clean drinking water and strengthen health care and medical services. It can improve and make more accessible communication and information technologies. It is also essential for sustainable economic development. Evidence shows that investing in scientific knowledge and new forms of innovation and technology are powerful contributors to inclusive growth. For all these reasons, STEM education plays a key role in building knowledge societies, founded on human rights and dignity, where all citizens have access to knowledge and share in its creation.

Therefore, efforts need to focus on preparing students at all levels to be global citizens and contribute to achieving the new sustainable development objectives of UNESCO's Agenda 2030. In this framework, the many opportunities that STEM education offers to develop the natural curiosity and creativity of young students should be central to the curriculum's intentions in their early years. In the secondary years, the role of STEM in the students' worlds outside of school should play a powerful motivating role. These

[2] PISA, OECD. (2012). *Results in Focus: What 15-year-olds know and what they can do with what they know*. The National Science Board, 4201 Wilson Boulevard, Arlington, Virginia 22230.
[3]Mullis, I. V., Martin, M. O., Gonzalez, E. J., & Chrostowski, S. J. (2004). *TIMSS 2003 International Mathematics Report: Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*. TIMSS & PIRLS International Study Center. Boston College, 140 Commonwealth Avenue, Chestnut Hill, MA 02467.
[4]Jenkins, E. W., & Pell, R. G. (2006). *The Relevance of Science Education Project (ROSE) in England: a summary of findings*. Leeds: Centre for Studies in Science and Mathematics Education, University of Leeds.

curricular decisions about interest and science, practices that inform students and their parents about the exciting prospects of science–based careers need to be developed in school.

PERFORM, as a Horizon2020 funded project, aims to investigate the effects of the use of innovative science education methods based on performing arts in fostering young peoples' motivations and engagement with STEM in selected secondary schools in France, Spain and the United Kingdom. Emphasizing Responsible Research and Innovation (RRI) values, PERFORM targets to train Europe's future generations with key competences in science education needed for the social development and inclusion of European citizens, paying special attention to gender equality and participation in STEM-related fields, as well as the humanitarian and responsible uses of scientific knowledge.

The PERFORM project looks to move beyond merely increasing scientific and technological knowledge to developing a reflective knowledge of science in which young people can consider its purposes, values, and how it becomes reality. Learning science involves values restructuring of perception and, through this, young people might come into new relationships with the subject, and perhaps themselves, in establishing their identity. To these ends scientific researchers, performers and young people have to work together in schools for developing performance-based activities. It is hoped that such collaboration will increase young people engagement with science, its values and the research processes.

The present document aims to outline the strategic actions to ensure the sustainability of the PERFORM project. The goal is to provide to the members of the PERFORM's consortium a clear picture of what could be done to ensure there are long lasting results after the end of the EU's funding. In this framework, the following components for ensuring an effective sustainability of PERFORM will be described in this document:

1) PERFORM's findings
2) Partners and network to be tackled
3) PERFORM as a renewable system

2. PERFORM's FINDINGS

Given that quality STEM education teaching material is a paramount, the sustainability of PERFORM will first be guaranteed by developing effective findings that will result from this project research. The PERFORM project findings are the following:

2.1. PERSEIAs

PERformance-based Science Education Innovative Activities (PERSEIAs) will be the main finding of the PERFORM project. PERSEIA are an innovative science education activities based on performing arts (i.e., stand-up comedy, busking theatre, and clown based on improvisation theatre)that consist in engaging girls and boys in STEM and related careers through a participatory educational process with secondary school students, their teachers and early career researchers. By the end of PERFORM's project, detailed methodological protocols describing how to co-create and implement effective PERSEIA will be generated. These methodological protocols to be developed will be produced into dedicated toolkits targeting students, teachers, researchers and museums.

2.2. Toolkits

Training toolkits will also be developed for both teachers and early career researchers interested in fostering their communication skills and abilities to develop performances to improve science learning. These toolkits will include background information on PERSEIAs, guidelines on how to develop the skills identified as essential for PERSEIAs and a collection of case studies and best practices resulting from the PERSEIA activities developed in the different participating countries (France, Spain, UK) as well as tips on how to implement them.

The above-mentioned findings will be high quality STEM pedagogic materials. These findings will be a powerful science education tools for training and engaging youngsters in STEM careers. Promoting them at a large scale and integrating them into the national science education curricula across Europe and beyond will ensure the long last of PERFORM. The following section contains more details in this regard.

Toward sustainability….

	Actions to Do
Science communicator	▪ Toolkits must be designed in an easy way to be interpreted by the different stakeholders ▪ A simplified version of the main results of the process of development of PERSEIAs will be provided to enhance the curiosity of possible stakeholders interested to use the Perform results beyond the already identified stakeholders
All consortium members	▪ Open access to findings in the PERSEIAs development ▪ Online accessibility to the tools will be provided through the partners' website event after the end of the project and even after the decommission of the project website

3. PARTNERS, INSTITUTIONS AND NETWORKS IN THE SUSTAINABILITY PLAN

Sustainable development of PERFORM is not only dependent on the project findings. It must also fundamentally be linked to the development of solid partnerships and relations between PERFORM and all the relevant stakeholders or networks that could help to maintain or expand the outputs of the project after the end of the EU funding. Sustainability of the PERFORM project will be ensured by strong cooperation not only in the academic spheres and its networks but foremost with policy makers at local, regional and national level.

3.1. Policy makers

The impact of PERFORM's findings will be guaranteed by integrating PERFORM's toolkits and related PERSEIAs into national European science education curricula. To this end from the beginning of the project, PERFORM through Work Package 5 (Sustainability and Policy Impact), was designed to ensure policy linkages between PERFORM and science education policy and decision-makers. This mandate of WP5 led by UNESCO will first start in the three pilot countries - France, Spain and United Kingdom. Furthermore, and as part of PERFORM' sustainability, UNESCO will scale up its policy links action across Europe and beyond.

UNESCO with its 195 Member States has the ability to convening power and access to science/education Ministries and Ministers. This specificity of UNESCO will ensure strong visibility and promotion of PERFORM. In this framework, UNESCO will undertake the following actions toward the sustainability of the PERFORM project:

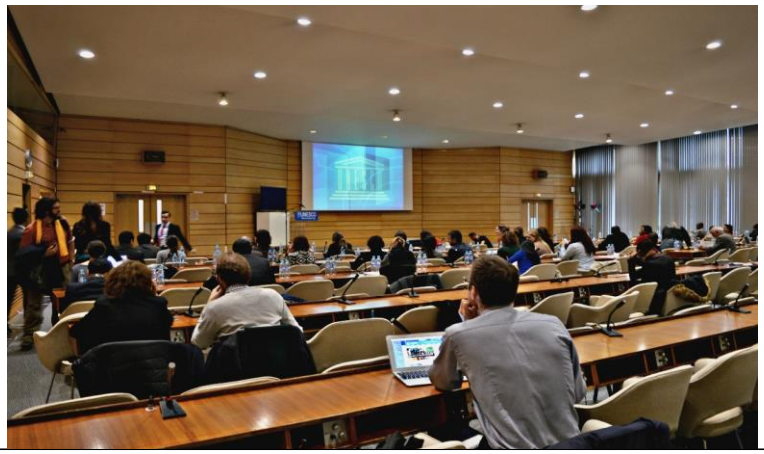
1. Advocate and promote PERFORM's findings among its Member States(see box 1);
2. Host high level and cross-interaction meetings with policy and decision makers;
3. Conduct interviews and arrange separate roundtables and focus groups with key PERFORM stakeholders and science/education Ministers, accessed through the UNESCO National Commissions in each European Member States and beyond;
4. Participate to the most relevant science policy forums focusing on science education and communication.

On the occasion of World Science Day for Peace and Development 2016, PERFORM consortium gathered at UNESCO Headquarters about 80 secondary school children and 56 UNESCO permanent delegations including France, Spain and USA.A general presentation of the project was made to the audience followed by three different performance shows based on stand-up comedy, clowning and busking science.

"This is a simple and effective way to engage youngsters into STEM" (Delegate from Luxembourg)

"It was really entertaining; the approach is interesting" (Delegate from Ireland)

"This (PERFORM) is a fantastic project; it should be widely spread not only in Europe but also in developing and emerging countries"(Delegates from Egypt and Gambia)



Box 1. PERFORM's presentation for Policy Makers at UNESCO

In addition to the above mentioned actions, and based on its know-how in designing scientific and educational policies, UNESCO will design two specific policy briefs and recommendations to be translated into the European national STEM' policies.

- The first policy brief will summarize the best practices and strategies to incorporate the PERSEIAs into the European science policy community of researchers and practitioners.
- The second policy brief will include an analysis of successful case studies on how the training tools developed by PERFORM can be effectively incorporated into the European science policy community of practitioners and teachers.

These two policy briefs will be largely disseminated among UNESCO's Member States. Especially, UNESCO's International Basic Sciences Program (IBSP) through its section dedicated to Capacity Building and Innovation and in liaison with the Education Sector, will further disseminate PERFORM's findings by using the network of UNESCO's centers dedicated to science and education.

Toward sustainability...

	Actions to Do
International network (IN)	▪ Organize more separate roundtables and meetings with policy and decision makers ▪ Set up a series of meetings with all UNESCO's electoral groups; Advocate PERFORM to them ▪ Find key contacts in the relevant science / education Ministers at national level. Link them with PERFORM's team.

In parallel to these efforts to maximize the impact of PERFORM's findings at decision and policy makers level, the PERFORM's consortium should also nurture and amplify cooperation with partners and networks related to the academic sphere.

3.2. Academic institutions

An important element for the success of the PERFORM project after the end of the EU funding will be the strong links and interactions between PERFORM and the academia. The PERFORM consortium needs to work closely with the academic sphere to integrate PERFORM's findings in their pedagogic materials and curricula. To this end, the consortium, especially the universities involved in the project, ought to team up and create in every way new partnerships to raising the profile of PERFORM and promote the project findings among the other academic institutions and academic stakeholders.

PERFORM's consortium must target and explore synergies and mutual interests with the following academic institutions or stakeholders: universities, researchers and young practitioners; teachers; students; teacher unions or associations; and other Horizon2020's projects (see Table 1).

Table 1. List of the current and potential educational networks and partners.

Academic Partnerships	**Consortium**	**University**	Universitat Oberta de Catalunya
			Universitat Autònoma de Barcelona
			University of Bristol
			University of Warwick
	Extra-Consortium	**University**	Universitat de Barcelona
			Universitat Pompeu Fabra
			University of Madison
			University of Bordeaux
		Research Center	WISERD Education (Wales institute of Education Research at Cardiff University)
			Centre de Recherche Interdisciplinaire (Paris)

		Institution	Barcelona Education Consortium
		European Network	Scientix
			European SchoolNet
		Public Administration	Fundación Española para la Ciencia y Tecnología (FECYT)
		Others	Secondary schools
			Graduate and postgraduate schools
			Local and regional teachers' associations
			Teachers and researchers

PERFORM needs to address one of the biggest challenges for STEM education and teachers: to be up to date. Therefore, it is crucial for PERFORM to find other partners to work with and then making contact to build up effective collaborations. The two instruments below should be used to nurture these collaborations:

- **Memorandum of understandings (MOU)** with partners' networks and stakeholders. The main goal of these MOUs will be to share with other relevant academic partners(apart from the initial consortium) the findings developed during the implementation of PERFORM;

- **Collaboration on bilateral basis** at local, national or international level must be forged with the above-mentioned academics institutions, bodies or stakeholders. At local level, the PERFORM's consortium partners will be encouraged to build up their own network relations with local partners.

In addition to the previous proposed actions, the consortium could also rely on UNESCO's expertise in the education field in order to reinforce and build up effective relationships with teachers and schools especially at national and international level. For instance, the UNESCO's network of schools (ASPnet) could further contribute to the success of PERFORM by encouraging more European schools to be part of the project or

benefiting from the project findings.

In the same vein, PERFORM's findings could be connected to the science education activities or projects run by UNESCO's affiliate centers such as:

- Technical and Vocational Education and Training (TVET);
- The World Academy of Sciences for the advancement of science in developing countries (TWAS);
- International Centre for Theoretical Physics (ICTP);
- The European Organization for Nuclear Research (CERN).

Toward sustainability….

	Actions to Do
University (U)	▪ Nurture the ongoing relations and partnerships already established ▪ Expand cooperation with academia using the list of institutions listed in table 1
International network (IN)	▪ Further use UNESCO's expertise in the field of education ▪ Link PERFORM with the Division of Teacher Skills of UNESCO's Education sector ▪ The International Basic Science Programme of UNESCO could connect PERFORM's with one of its long-term partner: the International Council of Associations for Science Education (ICASE) ▪ Seek for further synergies with other H2020 projects

3.3. Other networks

In this age of digital interconnectedness, young people's perception of STEM is changing largely because of media. Nowadays, science is a much larger topic in media presentations and that can catch the imagination. In this framework, PERFORM's legacy must also be integrated and disseminated through relevant media platforms.

The promotion of PERFORM's findings must then be done through various type of media including electronic and digital platforms and newspapers that deal with promoting innovative science education ways to engage young people into STEM.

Digital science education platforms

During the first year of its implementation, PERFORM was included in the Scientix network. This allows the PERFORM project to be connected to the largest European teachers' digital platform dedicated to advancing and promoting science education as the goal of this partnership and will far more connect the findings of PERFORM with the biggest community of teachers interested in to STEM in Europe and beyond.

PERFORM as also developed its own digital tools to promote the results of the project. In particular, a dedicated webpage (www.perform-research.eu) has been created to that purpose.

Newspapers and relevant publications

In addition to the digital platforms and as part of the sustainability of the project, the use of printed media and relevant science education publications and journals must serve the dissemination of the project findings. The relevant newspapers and potential publications are listed in Table 2.

Social media

PERFORM is also available on several social media including Facebook, Twitter, Instagram and YouTube.

More information about PERFORM's communication strategy is available in deliverable D6.1 (Communication strategy) uploaded on the participation portal on 29/02/2016.

Table 2. List of current and potential media networks for PERFORM dissemination.

Networks	**Digital**	**Digital science education platforms**	British Science Association Collective memory pages
			ESTIM portal
			Eusea's website
			La Web Pedagogique
			PSL explore
			RRI toolkits
			Science Made Simple's website
			Scientix'swebsite
			UniversitatOberta de Catalunya'swebsite
		Newsletters	British Interactive Group Newsletter
			Engage Newsletter
			Espace Pierre-Gilles de Gennes Newsletter
		Social Media	Facebook
			Instagram
			Twitter
			YouTube
	Paper	**Newsletters, magazines and relevant critical and creative publications**	AMCSTI Publication
			Dimensions (Physics/Chemistry Higher Education journal)
			ECSITE Magazine

			International Journal of Critical Pedagogy
			International Journal of Education through Art
			International Journal of Science Education
			Local Newspapers
			Newspapers and Journals in countries of the Eusea Members
			Physics Education (IOP Publication)
			Public Communication of Science & Technology (PCST)
			Public Understanding of Science
			Science Education Journal

4. PERFORM AS A RENEWABLE SYSTEM

Establishing an effective and proactive consortium along with a stable funding sources are key to ensure the success of a project such as PERFORM. These two elements if combined properly, would ensure a long lasting and legacy of the PERFORM project and its findings.

4.1. A proactive consortium

Sustainability of a project is about not only good findings, partners and networks. It is also, mainly about the people that are involved in the project. An active and strong commitment of all partners is key to delivering and ensuring high quality results.

PERFORM is an international consortium with various type of partners: distinguished universities, successful professional science communication entities involved in science and arts engagement, and well known multilateral organizations. PERFORM's consortium is led by Universitat Oberta de Catalunya (UOC).

In the building of this Sustainability Plan and with the aim of strength the consortium capacity for exploitation and dissemination, UNESCO carried out a survey among the partners to identify issues or concerns related to the consortium internal communication throughout the development of the first year of the project. Some of the main recognized difficulties were linked to a lack of communication among WP leaders and case study coordinators; an excessive use of e-mails as the main way of interaction, bringing some confusion to the board; some legal and ethical issues related to working with underage students; challenges in implementing a collaborative use of social media among all partners.

The consortium has managed to deal and adapt to these issues by remaining active and dynamic. The Internal Communication strategy plan works tightly linked to the sustainability of the project, aiming to guarantee a fluid interaction among partners and avoid having the previous issues limiting capacity for exploitation and dissemination actions. This plan lays the ground for the means and amount of communication between partners and the most reasonable way to proceed in each case.

Related to the legal and ethical aspects concerning the working with underage students, the consortium might deal with some countries requiring certain official documents, sometimes including signed parents' consents for every student participating in the project. On the same hand, for instance, in the United Kingdom's schools, the use of social media by the students (Twitter, Facebook, etc.) for academic purposes is not allowed.

Furthermore, the presentation of an Advisory Board (AB) will serve to help the current monitoring tools developed by the coordination team to treat specific issues and analyze particular cases. It will act as an external and independent reviewer of the project. The membership and commitment of the AB was defined and established along the first year of the project. It is an interdisciplinary and interpectoral panel composed of distinguished experts from different backgrounds including education and communication research, STEM fields, national education agencies, and Responsible Research and Innovation (RRI).

Toward sustainability…

	Actions to Do
All consortium members	▪ Stick with the Internal communication strategy plan ▪ Seek always for consensus and dialogue and mutual understanding ▪ Revert to the AB always when necessary
University (U)	▪ Find the ways to compensate issues related to the use of social media by the students in the UK for academic purposes by using other dissemination

4.2. Funding viability after the end of EU funding

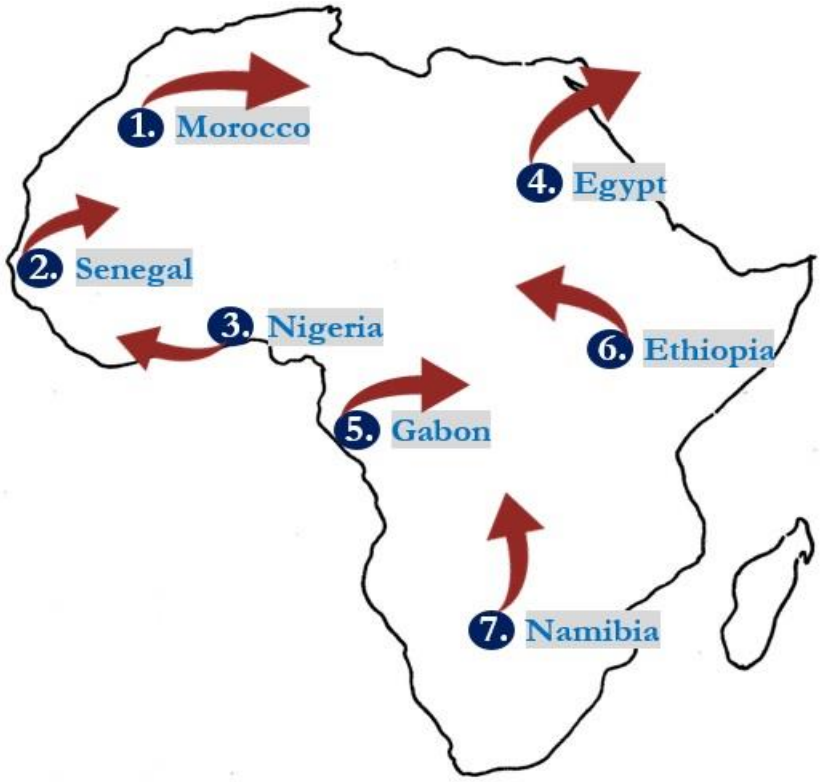
UNESCO's role within the PERFORM's consortium is to promote the sustainability of the project and to embed policy linkages between PERFORM and EU science education policy and decision-makers. As part of its mandate in finding out effective ways to ensure the legacy of PERFORM's findings, UNESCO is also in charge of seeking additional financial and intellectual support through strategic partnerships to ensure that the outcomes of PERFORM are kept up and running once the grant period is over.

In this framework and in order for UNESCO to meet its objectives and commitments, the section of Capacity Building and Innovation of UNESCO's Science sector has proposed and submitted the project MY PERFORM as possible way of expansion of PERFORM across the world.

MY PERFORM will outline the ways of the original PERFORM project could be adapted in the developing countries. The idea is to expand and reshape the initial project by tailoring it based on the daily reality of those that will be the beneficiaries. The social and cultural dimension of the environment in which the students and their teachers are living in will be highly taken into account in the design and implementation of MY PERFORM.

MY PERFORM will focus on the realities and problems that the final beneficiaries are facing in their daily life and environment. Therefore, the thematic that will be tackled by the project will be aligned with UNESCO global priorities in STEM to achieve the Sustainable Development Goals (SDG) by 2030 in the field of science education. These priorities include topics such as Youth, Gender Equality, Capacity Building, Nord-South Cooperation, South-South Cooperation, Climate change, Research and Innovation. In the same vein, the MY PERFORM project will address the following SDG's: SDG 4: Quality Education – SDG 5: Gender Equality – SDG 10: Reduced Inequalities – SDG 13: Climate Actions.

MY PERFORM will be implemented in two different phases. The first phase of the project will consist in **training and capacity building activities** with and for students, teachers and young researchers in selected countries. In our example, seven countries will be pilots: Morocco, Senegal, Nigeria, Gabon, Namibia, Ethiopia, and Egypt. In the second phase of MY PERFORM, trainees will train their communities at national and regional level; that will be the **MY PERFORM Ambassador Program (MPAP)**.



As an example, the project will be first implemented in Morocco
then in phase II - (MPAP), Algeria and Tunisia.
Same for the rest of the countries listed

Box 2. Implementation of MY PERFORM

MY PERFORM will be coordinated by UNESCO with the help and support of the initial consortium. UNESCO will seek for the necessary additional funds that will allow a smooth start and implementation of the project. In this framework, the Organization will advocate and leverage new financial support for MY PERFORM. UNESCO will target several funding sources including:

- **EU**, in particular the European Commission's Directorate-General for International cooperation and Development (DG DEVCO)
- **Development Banks** such as the African Development Bank (AfDB), the Inter-American Development Bank (IADB), etc.
- **Development Agencies** such as GIZ (Germany), SIDA (Sweden), etc.
- **G8/G20 countries** or Self Benefiting
- **Private sector companies** and Foundations

MY PERFORM is still a draft proposal that is being refined and finalized. The current draft focusing on Africa is just an example of what could be done to spread PERFORM's findings outside Europe. Once validated by all stakeholders involved including the PERFORM's consortium, UNESCO will scale up the advocacy and fundraising process to instigate the project and therefore expand and continue the legacy of PERFORM.

Toward sustainability....

	Actions to Do
All consortium members	▪ Help enhancing the project proposal to make it strong and appealing for potential donors
International network (IN)	▪ Further promote the idea of MY PERFORM among the UNESCO's Member States ▪ Identify and start approaching key potential stakeholders among Development agencies and Private sector companies and foundations ▪ Signed the first MY PERFORM partnership's agreement by the end of the PERFORM project (preferably during the final event at UNESCO)

5. CONCLUSIONS

The sustainability of PERFORM will mainly rely on three pillars:

- First, the developed findings during the course of the project research, classified as PERSEIA and Toolkits, will guarantee the initial stages of viability of PERFORM, as they will be the validation of the project's success. The end of PERFORM's project will be marked by the generation of high-quality pedagogic protocols of how to develop the PERSEIAs, which will be packed into the toolkits received by schools, students, teachers, researchers and museums.
- Second, a supportive and cooperative functioning within the PERFORM's consortium, led by Universitat Oberta de Catalunya, together with a solid partnerships with the surrounding networks and collaborating institutions, are essential for the sustainability of the project. A strong commitment among all partners, is a vital factor for the perdurance of PERFORM. In terms of networking, UNESCO and the Universities participating in the consortium will have a central role in linking stakeholders to the project and, if possible, fundraising. The link between PERFORM and the Academia will be guaranteed by developing two instruments: (a) the Memorandum of Understandings (MOU) aims to share PERFORM's findings with stakeholders and relevant academic partners; (b) the Collaboration on Bilateral Basis will be reinforced at the local, national and international level to strengthen the relations between the project and its networks. Corresponding to the interaction between the consortium and the external partners, media diffusion is also essential. PERFORM's findings and results will be shared through different portals and papers, both printed and digital, through partners' websites, science education platforms, social media and local papers and magazines.
- Third, the dynamism and constant adaptation of the consortium, remaining always as a proactive organism and a renewable system, is fundamental for problem solving and obstacle anticipation. In this way, the Internal Communication Strategy Plan sets up the basis for the interaction and cooperation among the partners. Furthermore, UNESCO will be key in the viability after the EU funding is over by bringing policy and decision makers together with the consortium, and the building up of a continuation of the project in other countries and regions, adapted to their own need and difficulties.