**Project Number:** 665826

**Project Acronym:** PERFORM

**Project title:**

Participatory Engagement with Scientific and Technological Research through Performance

**Periodic Technical Report**

**Part B**

**Period covered by the report**: from 01/11/2015 to 31/01/2017

**Periodic report:** [1st]

# Contents

## *List of acronyms*

| | |
|---|---|
| **AJA**: | L'Atelier des Jours À venir |
| **DoA:** | Document of Action |
| **EC:** | European Commission |
| **EUSEA**: | European Science Events Association |
| **GA:** | Grant Agreement |
| **LAC:** | Les Atomes Crochus |
| **PERSEIAs**: | Performance-based Science Education and Innovation Activities |
| **PO:** | Project Officer |
| **PW**: | Participatory Workshops |
| **RRI**: | Responsible Research and Innovation |
| **SC**: | Steering Committee |
| **SMS**: | Science Made Simple |
| **STEM:** | Science, Technology, Engineering, Mathematics |
| **TBVT**: | The Big Van Theory |
| **TRACES**: | Théories et Réflexions sur l'Apprendre, la Communication et l'Éducation Scientifiques |
| **UAB**: | Universitat Autònoma de Barcelona |
| **UNESCO**: | United Nations Educational, Scientific and Cultural Organization |
| **UoB**: | University of Bristol |
| **UOC**: | Universitat Oberta de Catalunya |
| **UoW**: | University of Warwick |
| **WP**: | Work Package |
| **WSDPD**: | World Science Day for Peace and Development |

# 1. Explanation of the work carried out by the beneficiaries and overview of the progress

During this first reporting period (Month 1 to Month 15), the PERFORM consortium conducted relevant research to gather key knowledge and views on science and technology from the different **targeted actors, i.e. secondary school students, their teachers, and early career researchers**, in case studies in France, Spain and the UK. Informed consent to participate in the project was obtained from all participants. This served as a basis to generate key results towards the **PERFORM overall objective** of investigating how the establishment of a direct interaction between students and researchers by using performing arts methodologies for science education impacts on students' motivation and interest towards science, technology, engineering, and mathematics (STEM).

Specifically, exploitable results in this period include i) the development of guidelines to transform learning activities combining arts and science into **performance-based science education and innovation activities (henceforth PERSEIAs)** addressing the human dimension of science and the values of the Responsible Research and Innovation (RRI) approach, and ii) the design of a **participatory assessment methodology to evaluate students' learning and engagement outcomes** from the educational process of co-production of their own PERSEIAs.

Our consortium also set the ground for developing **trainings for early career researchers and secondary school teachers** to equip them with the tools to improve their skills on science communication, performance and reflexivity.

Furthermore, considerable effort was put into management and dissemination and communication actions, ensuring an effective technical progress and use of resources of the project, and the timely transference of the newly generated knowledge to the scientific and education communities across Europe through **online and offline communication tools and platforms**, including **Scientix and policy events**.

In sum, **ten deliverables** and **two milestones** were successfully achieved (Table 1) and **two exploitable results were generated** (Table 2) in line with the Annex 1 of the Grant Agreement (GA).

*Table 1.* Deliverables approved and milestones achieved in reporting period Month 1-Month 15.

| WP no. | Del./ Mil. | Deliverable/Milestone name | Lead beneficiary | Peer-reviewed by | Delivery Month |
|---|---|---|---|---|---|
| WP1 | D1.1 | Internal communication strategy and intranet | UOC | EUSEA, UAB, UOC | 4 |
| WP1 | D1.2 | Risk management plan | UOC | UoB, TBVT, UOC | 6 |
| WP1 | D1.4 | Data management plan | UOC | UAB, EUSEA, UOC | 6 |
| WP3 | M1 | Selection of the specific training skills to be developed | UoB | UOC | 7 |
| WP4 | D4.1 | Methodological aspects of science education assessment | UAB | TBVT, UoW, UOC | 7 |

| WP no. | Del./ Mil. | Deliverable/Milestone name | Lead beneficiary | Peer-reviewed by | Delivery Month |
|---|---|---|---|---|---|
| WP5 | M2 | Identification of actions for sustainability | UNESCO | UOC | 8 |
| WP5 | D5.1 | Sustainability plan | UNESCO | EUSEA, SMS, UOC | 15 |
| WP6 | D6.1 | Plan for communication, dissemination and exploitation | EUSEA | UNESCO, AJA, UOC | 4 |
| WP6 | D6.2 | Website and social media launch | EUSEA | SMS, TRACES, UOC | 6 |
| WP7 | D7.1 | POPD – Requirement No. 2 | UOC | -- | 6 |
| WP7 | D7.2 | H – Requirement No. 9 | UOC | -- | 4 |
| WP7 | D7.3 | POPD – Requirement No. 4 | UOC | -- | 3 |

*Table 2.* Summary of the exploitable results generated in reporting period Month 1-Month 15.

| WP no. | Exploitable result | Involved beneficiaries | Means for current and further exploitation |
|---|---|---|---|
| WP2 | Protocols to create PERSEIAs on stand-up comedy, clown based on improvisational theatre and science busking | **TBVT**, **TRACES**, **SMS** | Participation in science policy events (e.g., UNESCO WSDPD Nov 2016) and science communication and education conferences (e.g. ECSITE 2016).<br><br>Publication at PERFORM website and social media (including videos)<br><br>Publication at Scientix, RRI-Tools and related platforms. |
| WP4 | Participatory assessment methodology based on RRI indicators to evaluate science learning and engagement outcomes | **UAB**, **UOC** | Publication in top peer-reviewed journals on science education and communication and books of international distribution.<br><br>Participation in scientific conferences and outreach events (e.g. RRI-Tools 2016).<br><br>Publication at PERFORM website, newsletter and social media.<br><br>Publication at Scientix and RRI-Tools website. |

## 1.1 Objectives

In this reporting period, our consortium conducted work towards the achievement of the four specific objectives listed in the PERFORM Document of Action (DoA), as follows:

***<u>Objective 1.</u> To explore new science education methods based on scenic arts that lead secondary school students to understand and to learn about STEM***

To address this objective, PERFORM carried out a total of **31 exploratory workshops** with groups of 15 to 30 students in four secondary schools in selected case studies (France, Spain and the UK) to gather information on students' perceptions and attitudes towards STEM subjects and careers, and their views on RRI values. A total of **467 students from low and medium socio-economic backgrounds** participated. During these workshops students engaged in discussions about STEM careers and market opportunities, science related stereotypes, ethics in science, dialogue between science and society, gender equality in STEM careers, and EU societal challenges.

As a result, our consortium generated guidelines to transform science-related activities using performing arts into PERSEIAs that draw on three different performance approaches: **clown based on improvisational theatre, stand-up comedy, and science busking**. These PERSEIAs were delivered and tested in **35 secondary schools reaching a total of 2,407 students**, being 1,823 of them from Spain, 318 from France, and 266 from the UK. The assessment consisted of ex-ante and ex-post surveys to evaluate their effectiveness in fostering students' interest and motivation for STEM. Data obtained out of the evaluation process were analysed and findings are being used to generate an integrated protocol for creating PERSEIAs that includes key education and communication tools addressing the human dimension of science and the RRI values. This protocol is included in Deliverable 2.1, to be submitted out of the period of this report, in February 2017 (Month 16).

Furthermore, our consortium collectively worked in developing a **participatory educational process** actively involving students in inquiry learning on a scientific topic of their interest to provide them with transversal competences and RRI values. For that purpose, six **participatory workshops** were designed, which final output is the co-production of PERSEIAs by students with the support of their teachers and early career researchers. These participatory workshops are currently being implemented and tested with **a total of 102 students** in two secondary schools in Paris, two in Barcelona and one in Bristol. **Twelve teachers and 14 early career researchers** are involved. Selected schools in each case study belong to low and medium socio-economic backgrounds. Schools, teachers and parents of involved students, gave their free and informed consent to participate in the project.

***<u>Objective 2.</u> To identify and challenge limitations faced by secondary school teachers and early career researchers in teaching and communicating STEM to young people***

In this period, and to achieve this objective, PERFORM designed, delivered and tested a first round of **trainings on responsible science communication skills** for early career researchers in Barcelona, Paris and Bristol that were attended by a total of **56 early career researchers** currently, 14 of them totally or partially involved in participatory workshops at schools.

More specifically with these trainings PERFORM aimed to strengthen early career researchers' reflexivity about the scientific research practice and its values, and their engagement with society, in relation with the RRI approach. Trainings also focused on strengthening the ability of early career researchers to share aspects of their scientific research practice and experience with young people and teachers. These trainings were based on feedback gathered from early career researchers during a Knowledge Sharing Workshop organised in Bristol in April 2016 (Month 6), in which the limitations they may face when communicating science were discussed and their views on the kinds of training they would need as well as the best formats to deliver it were identified. In this workshop PERFORM partners also shared their respective skills and knowledge

on capacity building for science communication and education. The results of this workshop contributed to the achievement of Milestone 1 in May 2016 (Month 7). Other early career researchers and universities in Bristol, Paris and Barcelona were further approached for consultation in this regard. Based on the specific needs of the different cultural contexts three separate but complementary training programmes were developed. In doing this PERFORM looked at other national and European projects' examples of toolkits. Resultant trainings were delivered and evaluated in each case study. Relevant data from the first phase of training delivery were collected and is being analysed to improve the contents and format for the second delivery.

The consortium also had conversations with **secondary school teachers** involved in the project and different education experts to identify their needs and interests **for the design of training activities on science education and performance** that will be further developed in each case study within the project.

***<u>Objective 3.</u> To assess the impact of the participatory educational process in fostering secondary school students' motivations and engagement in science and with RRI values***

PERFORM contributed to this objective by developing **an innovative methodology for the impact assessment** of the participatory educational process on students' learning and engagement in STEM and scientific careers. To do this, a systematic literature review of assessment frameworks in science education was conducted, leading to the **identification of 86 expert-based indicators** of learning outcomes and process requirements related to cognitive and experiential learning aspects, transversal competences and RRI values. This was complemented with **7 participatory, case-specific indicators** identified through 11 exploratory workshops conducted with a total of 161 students in 11 schools in the three case studies. With these results, PERFORM produced a research report on the methodological aspects of science education assessments under a RRI approach, as Deliverable 4.1 in May 2016 (Month 7), a publication in a conference proceedings and two research articles currently under review in international journals.

By using these indicators, PERFORM designed a mixed methodology to assess, in a systematic way, the impact of the participatory educational process on students' learning and engagement with STEM. Such methodology included the assessment of cognitive and experiential aspects but focused on: i) the exploration of the capacity of the participatory educational process to transmit and embed RRI values through the PERSEIAs creation and performance, and ii) the assessment of the impact of such process in promoting students' acquisition of transversal competences to allow them engaging in scientific ideas and practices. Data collection methods targeted the different actors involved in the participatory education process (i.e. secondary school students, their teachers, early career researchers and PERFORM performers) and included structured observation, surveys, interviews, focus groups and formative evaluation for triangulation purposes. These methods are currently being applied before and during the participatory workshops for developing students' PERSEIAs to evaluate the learning process.

In parallel PERFORM started the preparation of data collection parameters for **social media data harvesting** on relevant online platforms to evaluate the feelings, perceptions and attitudes towards science and scientific careers of participant students.

***<u>Objective 4.</u> To implement a sound communication strategy for the dissemination and exploitation of the research results for widespread policy adoption and implementation across Europe***

To reach this goal, our consortium undertook actions for fostering both **dissemination and policy impact**. PERFORM elaborated the **plan for communication, dissemination and exploitation** of the project, included in Deliverable 6.1 in February 2016 (Month 4), through collecting feedback and comments by all partners. This plan included the identification of targeted audiences (e.g. teachers, researchers, policy makers) and online and offline communication tools

addressing different communities and audiences. Based on this plan, PERFORM designed its graphic identity and launched the **website** (www.performresearch.eu or www.perform-research.eu) and **four social media tools**: Twitter (*@performstem*); Facebook (www.facebook.com/performproject/); Instagram (*performstem*); YouTube channel (*perform research*). This was included in Deliverable 6.2 in April 2016 (Month 6).

In this period partners also conducted a collective effort to present the PERFORM project in a wide set of national and international contexts through their participation in **23 national, European and international conferences, meetings and activities** on STEM education, RRI and/or science communication for dissemination purposes. **One conference was organised by UNESCO for the World Science Day for Peace and Development (WSDPD)** celebrated at UNESCO Headquarters in Paris while other 13 events were organised by FP7 and H2020 projects, which allowed for identifying synergies and establishing links for dissemination purposes. In parallel, the consortium identified a relevant list of conferences that will serve as effective platforms to promote PERFORM and its impact during and beyond the life of the project. Moreover, the PERFORM project produced three press releases, two flyers, eight videos, appeared in a regional newspaper and at the UOC internal bulleting, and was included in the **Scientix network webpage** in September 2016 (Month 11).

For the sake of guaranteeing its policy impact, a series of internal and external meetings were conducted with the UNESCO Education sector and with representatives of Member States at UNESCO Headquarters to collect best practices and literatures as far as setting up medium- and long-term PERFORM sustainability actions. This achieved Milestone 2 in June 2016 (Month 8). Further actions for enhancing the sustainability of the project were discussed by all partners during the WSDPD. As a result, the **PERFORM sustainability plan** was elaborated and submitted as Deliverable 5.1 in January 2017 (Month 15). Also in this event, PERSEIAs were presented to **53 UNESCO permanent delegations and 80 students** from two local secondary schools in Paris.

## 1.2 Explanation of the work carried per WP

### 1.2.1 Work Package 1 (WP1): Project coordination and management

As WP1 leader, **UOC** coordinated both research and financial activities of the project according to the rules stated in the PERFORM GA, providing support to other partners when needed (Task 1.1). **UOC** also facilitated communication among consortium members through promoting the use of the intranet, organising online and face-to-face meetings, and producing internal e-newsletters (Task 1.2). **UOC** and **UAB** elaborated the RRI guidelines to be followed by the PERFORM consortium in order to monitor and reflect about the accomplishment of RRI process requirements through the development of the project. Advisory Board members were contacted and confirmed, who will have a key role in the following period (Task 1.3). Finally, the PERFORM project was included in the Scientix network, and links with H2020 projects such as RRI-Tools, NUCLEUS and HEIRRI, were established to identify opportunities for collaboration (Task 1.4).

**UOC** led the design and effective achievement of three deliverables within WP1, being the most important management results achieved in this first reporting period:

- **Deliverable 1.1** Internal communication strategy in February 2016 (Month 4);
- **Deliverable 1.2** Risk management plan in April 2016 (Month 6);
- **Deliverable 1.4** Data management plan in April 2016 (Month 6).

**UOC** was in permanent contact with the European Commission (EC) project officer (PO) mainly by e-mail and, in this period, had a face-to-face meeting in Brussels on February 4th 2016 (Month 4).

### *Task 1.1 Project management*

**UOC** led the management of two key actions involving changes in the consortium composition in this period. First, in November 2015 (Month 1), the initial coordinator of PERFORM, **UAB**, led the preparation of an amendment to include **UOC** as the new coordinator of the project, which was approved by the PO one month later with retroactive effects since the start of the project. Second, in late March 2016 (Month 5) **UOC** informed the PO that **LAC**, an association that was part of the PERFORM consortium was merged into another association called **TRACES** and that the activities conducted and to be conducted by **LAC** were transferred to **TRACES.** An UTRO (Universal Transfer of Right an Obligation) between **LAC** and **TRACES** was approved in November 2016 (Month 13) with retroactive effects since January 2016 (Month 3). For clarity purposes, hereafter we use the name of new association **TRACES** to refer to both **LAC** and **TRACES**.

**UOC** and the local partner **UAB** organised and implemented the kick-off meeting in Barcelona (Spain) in November 16th-18th 2015 (Month 1). Twenty members of the 10 partnering organisations participated in this three-day meeting, in which the different WPs, related tasks and case studies were presented and discussed, financial and technical questions were raised and solved, potential financial deviations were identified, and a common schedule for project activities was collectively agreed. The first General Assembly meeting, attended by all partners, and the first Steering Committee (SC) meeting, attended by WP leaders, were held during the kick-off meeting.

As planned in the DoA, during the reported period **UOC** organised two more SC meetings attended by all WP leaders. Both coincided with other consortium activities. The second SC meeting was co-organised with **UoB** and took place in April 4th 2016 (Month 6) after the knowledge sharing workshop in Bristol (see WP3). The third SC meeting was co-organized by **UNESCO** in Paris, on November 9th 2016 (Month 13) during the PERFORM presentation at UNESCO Headquarters framed in the WSDPD 2016 (see WP5).

**UOC** coordinated and supervised a proper technical and financial management through regular email correspondence, online and face-to-face meetings and phone conversations with other partners, providing support to the consortium members on reporting when needed. **UOC** provided advice to other partners for management issues (e.g. related to budget and p-m reallocations, to extension of deadline requirements, to technical and financial reporting issues), for dissemination issues (collecting inputs periodically from partners) and for ethical issues (e.g. procedure to collect consent forms in schools).

### *Task 1.2 Facilitation of the consortium communication*

In February 2016 (Month 4), **UOC** produced the **Internal and intranet communication strategy (Deliverable 1.1)** with the support of **EUSEA**, who was key in the definition of some functions to be implemented on the website through a simple intranet-like structure. In doing this, a constant dialogue was carried on between the coordination team at **UOC** and **EUSEA** to refine the internal communication strategy and the design of the intranet. The resulting **Deliverable 1.1** on the **Internal communication strategy** was peer-reviewed by **EUSEA** and **UAB** and comments were included by **UOC** in the final version.

PERFORM internal communication strategy aimed to design and maintain sound and effective internal communication tools among PERFORM partners. It first described the goals and expected outcomes of the project internal communication strategy and it then outlined the four main communication tools to be used by partners to enhance the exchange of information, discussion and reflection on the project progress. PERFORM internal communication tools consisted of i) an intranet for supporting document exchange and project management, ii) e-communication means for boosting day-to-day interactions, iii) project meetings for ensuring face-to-face interactions, organisation and implementation of project activities, and iv) an internal e-Newsletter for updating information about the project execution. Specifically, the intranet (http://www.perform-

research.eu/intranet/) was located at the PERFORM webpage as a private section only available for consortium members use and for internal communication purposes, as well as project repository, which was developed by **EUSEA**. **UOC** and **EUSEA** provided partners with guidelines for the use of the intranet. The coordination team ensured that all project-related files (research- and management-related) were and are being managed and stored at the intranet.

Also during the reported period, in July and November 2016 (Months 9 and 13), and to support internal communication among partners, **two internal e-newsletters** were elaborated by the coordination team at **UOC** providing a summary of the main activities and outcomes of the project at the time of their launching (Months 6 and 12).

***Task 1.3 Scientific coordination and project monitoring***

During the first six months of the project, **UOC** led the design of a **Risk management plan (Deliverable 1.2)** and a **Data management plan (Deliverable 1.4)**, two deliverables that were peer-reviewed before their submission by **UoB** and **TBVT**, and **UAB** and **EUSEA**, respectively.

In April 2016 (Month 6) the Risk management plan was elaborated by **UOC** with the support of **UAB** through a participatory process conducted within the PERFORM consortium to identify the risks that might occur during the project implementation with the aim of ensuring a smooth coordination of the project for a high quality of results and implementation. WP leaders (**TBVT**, **UoB**, **UAB**, **UNESCO** and **EUSEA**) were consulted during such process. The resulting **Deliverable 1.2** on the **Risk management plan** provided a detailed analysis of the nature and dimension of these risks, including their likelihood, the envisaged measures to mitigate them as well as the designed contingency plan in case of their occurrence.

In the same month, **UOC** elaborated **Deliverable 1.4** on the **Data management plan**, a document providing an overview of how the research data is organized, and how it is handled during the duration of the PERFORM project and after the project is completed. PERFORM data management plan was elaborated following the project ethical requirements described in WP7 deliverables (see WP7).

In this reporting period, **UOC** also coordinated the selection and the invitation of five experts to become members of the **Advisory Board** of the project. During the first SC, WP leaders identified potential candidates according to the required expertise for the project and the budget available who were contacted by **UOC**, **UAB**, **UoB** and **EUSEA** in April 2016 (Month 6). By August 2016 (Month 9) all invited Advisory Board members accepted the invitation and were asked to sign a non-disclosure agreement. By October 2016 (Month 12) **UOC** received all 5 signed agreements:

- *Roger Strand*, chairman EC expert group on RRI indicators (University of Bergen, Norway);
- *Daniel Erice*, entrepreneur in STEM and performing arts (Alioth Arte y Ciencia, Spain);
- *Emily Dawson*, expert on science learning and engagement, science education research (University College London, UK);
- *Àgueda Gras*, science programme manager and expert at European level (European Schoolnet, Belgium);
- *Frank Burnet*, science communication expert and artist (University of West England, UK).

For the sake of effectively monitoring both technical and financial progress of project activities, in April and October 2016 (Months 6 and 12) **UOC** led the elaboration of two internal reports. All project partners contributed and agreed with the final versions of the two reports.

Also in this period, **UAB** and **UOC** designed a shared protocol of RRI implementation and reflection guidelines to provide the PERFORM consortium with guidelines to meet a set of RRI process requirements. The document was based on the discussions held during the kick-off

meeting (Month 1) and the knowledge sharing workshop (Month 6), as well as on literature review and resources from the RRI-Tools H2020 project. Under the lenses of RRI, and in the context of the PERFORM project, our consortium agreed that *science education should foster critical thinking and reflexivity about science and scientific research, and embed social and ethical principles in the educational process, so as to enhance critical scientific literacy, contributing to equip students with knowledge, resources and skills to participate as active citizens in democratic societies and to better face current complex societal challenges.* Based on such understanding and the set of RRI process requirements identified during the knowledge sharing workshop, **UAB** and **UOC** organised, refined and formulated a set of RRI guidelines for PERFORM according to the four process dimensions of RRI, which were and are being addressed in the PERFORM's research process. These dimensions were: i) diversity and inclusion, ii) anticipation and reflection, iii) openness and transparency, and iv) responsiveness and adaptive change. As a result, a battery of 10 self-reflective questions were generated and will be answered by all PERFORM partners and discussed in the intermediate meeting of the consortium in April 2017 (Month 18) to effectively monitor and self-reflect on the inclusion of RRI in the different stages of the project. The questions are adapted to the PERFORM context from the self-reflective tool created by the H2020 RRI-Tools project and the Report on Quality Criteria of Good Practice Standards in RRI by Kupper et al. 2015.

### *Task 1.4 Links to STEM education research projects and networks at European level*

**UOC** led the inclusion of PERFORM at the **Scientix network**. In April 2016 (Month 6) a request was submitted to Scientix but due to the Scientix portal updating process, which meant a pause in the organization regarding the approval and uploading of new projects, PERFORM was finally uploaded in September 2016 (Month 11) (Figure 1).

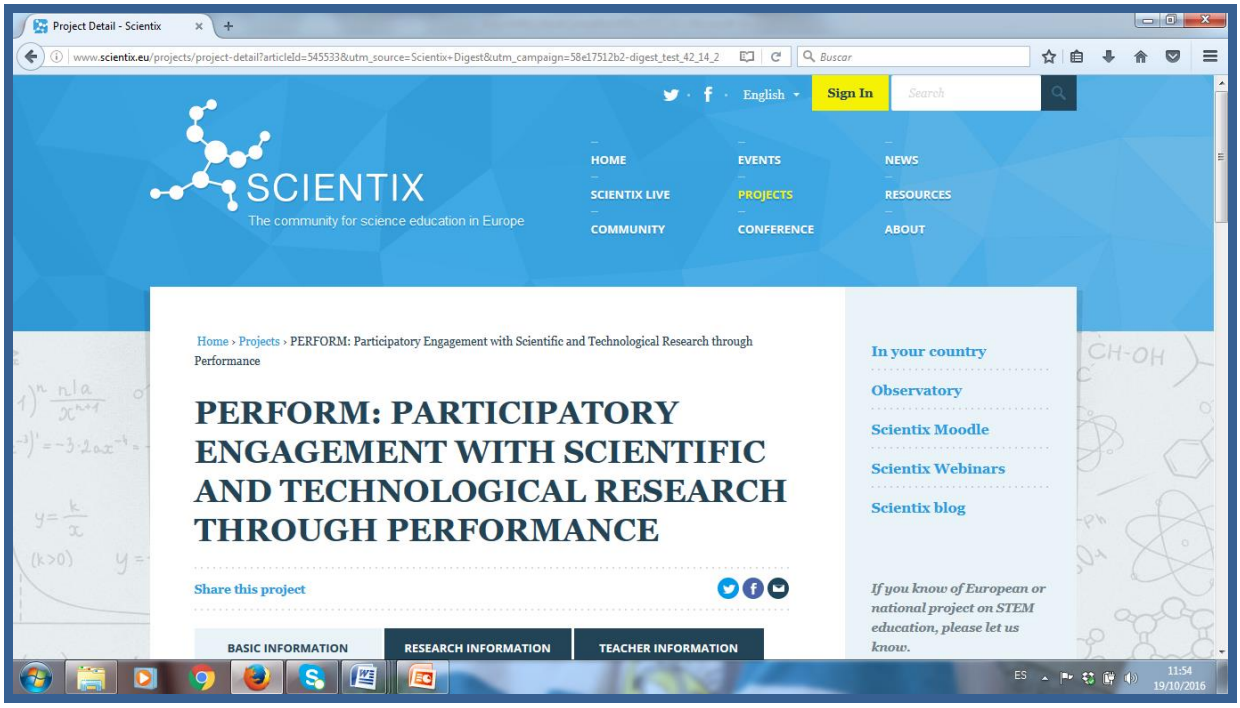


*Figure 1.* Screenshot of the publication of PERFORM at Scientix website, September 2016. http://www.scientix.eu/projects/project-detail?articleId=545533

In October 19th 2016 (Month 12) PERFORM was included in the Scientix newsletter. On that date Scientix Digest also listed PERFORM Deliverable 4.1 'Research report on methodological aspects

of science education assessment' (see WP4) as an available resource of the network: http://www.scientix.eu/resources/details?resourceId=13554&utm_source=Scientix+Digest&utm_campaign=58e17512b2-digest_test_42_14_2014&utm_medium=email&utm_term=0_738ebaa221-58e17512b2-44805069.

In parallel, **UOC**, **SMS**, **EUSEA** and **UAB** participated in **13 conferences, workshops and meetings organised by the National Contact Points and other FP7 and H2020 consortiums** to share PERFORM's experience with other researchers and to establish contacts with other EU projects and research institutions for further collaboration (see also Task 6.2). As a result of the established collaborations, in October 2016 (Month 12) the RRI-Tools webpage published the PERFORM project description and the initial Deliverable 4.1, uploaded by **UOC**, at: http://www.rri-tools.eu/-/d4-1-methodological-aspects-of-science-education-assessment.

**TRACES** and **TBVT** also started actions to link PERFORM with other FP7 and H2020 European projects in which they are involved ENGAGE (https://www.engagingscience.eu/en) and CREATIONS (http://creations-project.eu/), respectively.

### 1.2.2 Work package 2 (WP2): Innovative science education methods based on performing arts

As WP2 leader, **TBVT** coordinated the creation of new PERSEIAs in this period (Task 2.1). PERSEIAs drew on clown based on improvisation theatre in France, stand-up comedy in Spain and science busking in UK. These performance-based science education and innovation activities included the human dimension of science and the RRI values, as well as secondary school students' interests in STEM, in the three case studies. For doing so, case study coordinators (**TBVT**, **TRACES** and **SMS**) first designed and carried six exploratory workshops with 15-30 students in a total of 12 selected secondary school schools from low and medium socio-economic contexts (four schools in each case study). The results of these workshops supported the design of pilot PERSEIAs in May and June 2016 (Months 7 and 8). PERSEIAs were delivered by **TBVT**, **TRACES** and **SMS** from June to November 2016 (Months 8 to 13) in a total of 35 secondary schools in the three case studies and their impact on fostering students' interest in STEM was assessed with the help of **UoW, UAB** and **UOC**. Results from this action are being used by **TBVT** to generate a protocol for developing PERSEIAs that will be included in Deliverable 2.1 in February 2017 (Month 16), out of the period of this report.

Also in this reporting period, **TBVT** coordinated the design of a series of **participatory workshops** to be conducted with secondary school students from January 2016 (Month 15) and along the second half of the project with the aim of providing them with the necessary transversal skills to generate their own PERSEIAs with the support of their teachers and early career researchers (Task 2.2). These participatory workshops were reviewed and discussed with different partners (**AJA**, **UNESCO**, **UAB**, **TRACES**, **SMS**, **UoB** and **UOC**) and are currently being implemented by case study coordinators in two schools in Paris, two in Barcelona and one in Bristol.

#### *Task 2.1 Inclusion of the "human dimension" of science and the values embedded in RRI in performance-based activities*

In Month 1, case study coordinators led by **TBVT** started the design of new performance-based activities addressed to foster students' science learning and engagement, the PERSEIAs. In the PERFORM kick-off meeting, **TBVT**, **TRACES**, and **SMS** exchanged knowledge and views on the three different performance-based approaches to be used: clown based on improvisational theatre, stand-up comedy and science busking. They also shared knowledge with other partners such as **EUSEA** who gave examples of events using scenic arts to introduce STEM contents and

suggested strengthening the connection with the science events community to better address innovative science communication methods based on performing arts.

Based on this, **TBVT**, **TRACES**, and **SMS** designed six exploratory workshops to obtain information about students' concerns, needs and expectations in STEM education, as well as their interests on relevant scientific topics related to current EU societal challenges. **UAB** and **UOC** provided feedback to the exploratory workshops by focusing on the coherence of the design and data collection methods and the integration of RRI aspects. Specifically, these exploratory workshops were about the following topics:

- *STEM careers and market*, aiming to understand young people's perceptions and views on studying a STEM career and their future professional opportunities.
- *Science related stereotypes*, aiming to understand the stereotypes that young people associate with scientists.
- *Ethics in science*, aiming to explore students' views on ethical issues related to science, technology and innovation.
- *Dialogue between science and society*, aiming to understand how students currently interact with science and scientists and how students would like to interact with science and scientists.
- *Gender inequality in STEM careers*, aiming to explore students' feelings and beliefs related to gender stereotypes and STEM jobs and why do they think this is so.
- *EU societal challenges*, aiming to examine students' perceptions and attitudes towards the societal challenges highlighted by the EU, and to explore others of their concern.

Case study coordinators contacted potentially interested secondary schools from low and medium socio-economic contexts to participate in the workshops and finally recruited four of them in each case study (Table 3). Case study coordinators explained to school board members and teachers the project and the details of their participation, and obtained prior and informed consent from them and the parents of the participant students.

*Table 3.* Participant schools in exploratory workshops.

| Case study | School name and location | Socio-economic background |
|---|---|---|
| France | Collège les Toupets, Paris | Medium |
| | Collège Zay, Paris | Low |
| | Collège La Grange aux Belles, Paris | Low |
| | Collège Marie Curie, Paris | Low |
| Spain | IES Castellbisbal, Barcelona | Medium |
| | INS Santa Eulàlia, Barcelona | Low |
| | IES Consell de Cent, Barcelona | Low |
| | Institut Europa, Barcelona | Low |
| UK | Albany Academy, Manchester | Medium |
| | Brimsham Green School, Bristol | Medium |
| | Fairfield Highschool, Bristol | Low |
| | Derby High, Manchester | Low |

Criteria used to define the socio-economic level varied in each case study. In Spain, **TBVT** used the gross disposable household income per capita of the school neighbourhood according to the Catalan Statistics Institute (IDESCAT); in France, **TRACES** relied on the schools' financial category according to the 2016 "Bulletin officiel de l'éducation nationale"; whereas in the UK **SMS** classified the schools according to the percentage of students allegeable to free school meals (being the average for the country 15%).

From February to June 2016 (Months 4 to 8), **TBVT**, **TRACES** and **SMS conducted a total of 31 exploratory workshops** with groups of 15-30 students in four selected secondary schools in each case study (Figure 2). **UAB** attended the workshops in three schools in Barcelona and provided **TBVT** with recommendations to improve the discussions with the students while **UoB** attended the workshops taking place in the area of Bristol in the UK and posted discussions about them with **SMS** and teachers.


*Figure 2.* Exploratory workshops on STEM careers at INS Santa Eulàlia, Barcelona (top right), School Grange aux Belles, Paris (top left), and Fairfield High School, Bristol (bottom).

Data from collective discussions, role-play games and participatory observation on students' concerns, needs and expectations in STEM education, as well as their interests on relevant scientific topics related to current EU societal challenges, were collected in an Excel database by **TBVT**, **TRACES** and **SMS**, and analysed by **TBVT** through descriptive statistics and content analysis. Preliminary results from the Spanish case study were presented to and discussed by the consortium in the knowledge sharing workshop in Bristol (April 2016, Month 6), where

**UoW**, **UAB** and **UOC** proposed adjustments in data collection of pending workshops and gave recommendations to improve data analysis. During this meeting, and as an initial point for the design of the PERSEIAs, **TBVT**, **SMS** and **TRACES** discussed commonalities and differences that PERSEIAs from the three case studies had, and how to include the EU societal challenges and RRI topics.

During May and June 2016 (Months 7 and 8), and based on the findings from these exploratory workshops, **TBVT**, **TRACES** and **SMS** designed pilot PERSEIAs. **SMS** and **TRACES** met online regularly with **TBVT** to ensure that PERSEIAs drew on these results, included RRI values, and performance commonalities (i.e. all PERSEIAS were composed by small performances of about 10 minutes: busking experiments in UK, monologues in Spain and clown sketches in France). All three PERSEIAs also included reflexive moments and references to the EU societal challenges and RRI values that were identified as interesting for students in the exploratory workshops. Moreover PERSEIAs promoted dialogue between students and performers by using social networks. **TBVT**, **SMS**, and **TRACES** encouraged students to follow PERFORM on Twitter and Instagram, and to use *#performstem* for any photographs they took.

In June and July 2016 (Months 8 and 9) pilot PERSEIAs were delivered and tested in 7 schools in Spain by **TBVT**, 3 schools in France by **TRACES** and 2 schools in UK by **SMS** (see Table 4).

These PERSEIAs were assessed ex-ante and ex-post by online surveys addressed to students and designed by **UoW** with the collaboration of **TBVT**, **UOC** and **UAB**, and using the Qualia system developed by **UoW** to enable automated data collection and initial analysis. This survey was not originally included in the DoA, but added during the kick-off meeting because of their relevance for ensuring the validity of final findings. **UOC** and **UAB** attended three of the PERSEIAs in Spain and met **TBVT** in July 2016 to provide them with suggestions for improving the monologues according to the RRI approach.

Based on this preliminary assessment and the complete analysis of the exploratory workshops, **TBVT** developed specific guidelines to create PERSEIAs related to gender equality and girl's barriers in STEM, science-related stereotypes, two-way dialogue between scientists and the society, ethical issues in scientific research and the role of entrepreneurial and multidisciplinary research careers in labour market. **UOC** and **UAB** contributed with suggestions to clarify the provided methodological guidelines, ensuring the coherence with PERFORM RRI guidelines, both by online and face-to-face meetings. Following these guidelines, in September 2016 (Month 11), **TBVT**, **SMS** and **TRACES** addressed practical challenges and made adjustments in their PERSEIAs. In France, **AJA** collaborated with **TRACES** to improve their PERSEIAs. Improved PERSEIAs were then implemented and tested in each case study in a second round, from September to November 2017 (Months 11 to 13), in 10 schools in the UK, 9 schools in Spain and 4 schools in France (see Table 4).

To sum up, **2,407 students from 35 secondary schools** attended PERSEIAs during both rounds: 318 students in 7 schools in France, 1,823 students in 16 schools in Spain, and 266 students in 12 schools in UK (see Figure 3). In the French case, to reach the 10 schools per case study planned in the DoA, **TRACES** will deliver their PERSEIA to 3 schools in June 2017 (Month 20), when performing in the Théatre Roger Barat in Herblay.

For the PERSEIAs assessment in the second round, and due to the low ratio of students' responses to the post-surveys gathered through Qualia system in the first round of PERSEIAs, **TBVT** designed a new strategy based on: i) pre and post online questionnaires to students, which included reviewed questions previously used in the online surveys based on the **UAB** critical feedback to ensure the overall clarity of the questions, and its appropriateness in the Spanish context, ii) PERSEIAs scripts content analysis by filling a template designed by **TBVT**, and iii) performers' perceptions on PERSEIAs content, by answering a structured interview script designed by **SMS.**


*Figure 3.* Delivered PERSEIAs on clown based on improvisational theatre in France (top left), stand-up comedy in Spain (top right) and science busking in the UK (bottom).

*Table 4*. Schools visited for PERSEIAs delivery in each case study.

| Case study | School name | Date | Number of students | Round |
|---|---|---|---|---|
| France | Collège Les Toupets | 14/06/2016 | 12 | 1 |
| | Collège Marie Curie | 10/06/2016 | 105 | 1 |
| | Collège Jean Zay | 16/06/2016 | 46 | 1 |
| | EREA Crocé Spinelli | 29/09/2016 | 8 | 2 |
| | Lycée Fénélon | 30/09/2016 | 52 | 2 |
| | Collège La Grange aux Belles | 09/11/2016 | 75 | 2 |
| | École Jeannine Manuel | 09/11/2016 | 20 | 2 |
| Spain | IES Castellbisbal | 23/05/2016 | 49 | 1 |
| | INS Santa Eulàlia | 23/05/2016 | 49 | 1 |
| | Institut Europa | 24/05/2016 | 132 | 1 |
| | IES Consell de Cent | 25/05/2016 | 127 | 1 |
| | IES Mare de Déu de la Salut | 26/05/2016 | 104 | 1 |
| | Institut La Ferreria | 27/05/2016 | 66 | 1 |
| | Abat Oliva | 27/05/2016 | 272 | 1 |
| | Príncep de Viana | 24/10/2016 | 62 | 2 |
| | Escola Virolai | 24/10/2016 | 71 | 2 |
| | IES Júlia Minguell | 24/10/2016 | 79 | 2 |
| | I.P. Federica Montseny | 25/10/2016 | 83 | 2 |
| | La Salle Montcada | 25/10/2016 | 127 | 2 |
| | Institució Montserrat | 27/10/2016 | 40 | 2 |
| | Maristes Sants-Les Corts | 27/10/2016 | 193 | 2 |
| | IES Lloret de Mar | 28/10/2016 | 187 | 2 |
| | Ramon Coll i Rodes | 28/10/2016 | 182 | 2 |
| UK | Fairfield High School | 30/06/2016 | 38 | 1 |
| | Brimsham Green School | 14/07/2016 | 31 | 1 |
| | Birkenhead School | 14/09/2016 | 11 | 2 |
| | St Michaels CofE School | 16/09/2016 | 19 | 2 |
| | Leighton Middle School | 21/09/2016 | 25 | 2 |
| | Brooklands Middle School | 21/09/2016 | 22 | 2 |
| | Linslade Middle School | 22/09/2016 | 25 | 2 |
| | Gilbert Inglefield Middle School | 22/09/2016 | 27 | 2 |
| | Fullbrook Middle School | 23/09/2016 | 21 | 2 |
| | The Castle School | 5/10/2016 | 7 | 2 |
| | Broadlands Academy | 20/10/2016 | 15 | 2 |
| | Albany Academy | 23/11/2016 | 25 | 2 |

From November 2016 to January 2017 (Months 13 to 15) **TBVT** analysed data gathered on the evaluation of PERSEIAs and, based on these results, wrote the **final protocol of tested methods to transform a performance-based activity into a PERSEIA** (Deliverable 2.1 to be submitted in Month 16). Results obtained out of the evaluation showed that PERSEIAs were overall a suitable tool to increase students' positive perceptions to STEM as well as their awareness on gender and ethical issues related to science.

***Task 2.2 Participatory process with young people, teachers and early career researchers***

This task started in August 2016 (Month 10), when **TBVT** with the support of **UAB**, **UoB** and **UOC** elaborated a presentation of the participatory educational process to be conducted within the project in four selected secondary schools (two schools from low socio-economic

background and two from middle socio-economic context) in each case study. This process consisted of a series of **participatory workshops (PW)** aiming to engage students in a direct interaction with early career researchers and their teachers to co-produce a PERSEIA. This presentation aimed to inform teachers of all the activities related to this process. **TBVT** contributed with information about the PWs with students, **UoB** contributed with information about trainings to teachers (see WP3), and **UAB** contributed by including information related to the assessment implementation tailored to schools and teachers' needs and context (see WP4). For the sake of coordinating the PWs at schools in the three case studies, **TBVT**, supported by **UOC** and **UAB**, wrote a protocol with detailed information about the development of these activities and did online meetings with **SMS** and **TRACES**.

In September 2016 (Month 11) **TBVT** designed the overall planning of the six PWs to be implemented in this task by defining the general and specific objectives to be reached in each one of them:

- PW1. Selection of relevant scientific topics that address societal challenges.
- PW2. Critical thinking and self-reflection.
- PW3. Gender issues.
- PW4. Interaction between arts and the scientific method.
- PW5. Performing skills.
- PW6. Rehearsal.

**TBVT** contacted partners with expertise on the PW's topics and collaboratively designed with them the activities of each workshop: **AJA, UNESCO, UAB, TRACES** and **SMS.**

Subsequently, **UOC** and **UAB** met **TBVT** to review preliminary versions of the PW protocols and contributed to improve some of them. Also in October and November 2016 (Months 12 and 13) several online meetings took place between **TBVT**, **UoB**, **SMS** and **TRACES** in order to adapt the PW protocols to the educational context of each case study and the different performance approaches used: clown in France, stand-up comedy in Spain, and science busking in UK. Partners also worked on this topic during the consortium meeting at UNESCO Headquarter in November 10th 2016. As a result of these discussions, **SMS** adapted the content and activities of the PWs while **TBVT** and **TRACES** kept the same protocols designed by **TBVT** for each PW.

**TBVT**, **SMS** and **TRACES** organized a first round of the implementation of the PW with the two selected secondary schools in each case study: scheduling meetings with teachers, explaining all the process, planning the PWs (dates, hours) and the final performance.

The first round of the implementation of these workshops started in January 2017 (Month 15) and will extend until May 2017 (Month 19). In Spain and France, workshops are being carried out by **TBVT** and **TRACES,** respectively, in two secondary schools (one school from low and one school from middle socio-economic background) in each case study. In UK one school from low socio-economic context is participating, since the planned second school in UK left the project due to short staffing problems. This will be corrected in the second round of PWs in early 2018, when **SMS** will implement the workshops in three secondary schools instead of two.

As to January 2017 (Month 15), 102 students, 12 teachers, and 14 early career researchers were involved in the PW implemented in two schools in Paris, one in Barcelona and one in Bristol (see Table 5). In the second Spanish school (IES Castellbisbal, Barcelona) PWs will start in February 2017 (Month 19). All participant early career researchers except one had attended a specific training to foster their responsible communication skills (see Task 3.2). This early career researcher was recruited by **TRACES** in January 2017 (Month 15) to ensure that at least one researcher accompanied the group of students in each workshop. **TRACES** prepared the researcher for the PW at the school in Paris.

Previous to the PWs, **TBVT**, **SMS** and **TRACES** conducted conversations with teachers in participant schools to create a social media channel to be used to generate dialogue between the students, the early career researchers and performers during the participatory process. In both Spanish schools (INS Santa Eulàlia and IES Castellbisbal), the social media chosen by teachers and also agreed with students were Moodle and WhatsApp. In France, such interaction occurred on a Moodle and a blog (Collège Les Toupets) and an undisclosed Facebook group (Collège Marie Curie). In UK, Fairfield High School teachers argued that students could not work outside of the workshops so it was not possible to have such a social media channel for communication. In this case the interaction between students, teachers, early career researchers and performers only happened and will happen during the PWs at the school.

*Table 5.* Schedule of PWs' implementation in the secondary schools in January 2017.

| Case Study | School name and location | PWs imple-mented | Dates | Students | Teachers | Early career researchers |
|---|---|---|---|---|---|---|
| France (Paris) | Collège Marie Curie, Paris | 1, 2 | 13/01/2017 27/01/2017 | 24 | 2 | 2 |
| | Collège Les Toupets, Vauréal | 1, 2 | 23/01/2017 30/01/2017 | 20 | 2 | 2 |
| Spain (Barcelona) | INS Santa Eulàlia, Terrassa | 1 | 27/01/2017 | 29 | 6 | 3 |
| UK (Bristol) | Fairfield High, Bristol | 1, 2 | 25/01/2017 | 29 | 2 | 7 |

**TBVT**, with the help of **UOC**, recruited the two secondary schools (IES Consell de Cent and IES Moisès Broggi, both in Barcelona city) for the second round of PW implementation. **SMS** also recruited two schools (Broadlands Academy and Bridge Learning Campus, both in Bristol) and is in the process of recruiting a third one to replace the one dropping its involvement in the project due to staff problems. **TRACES** will recruit the two schools from Paris participating in the second round of PWs in the following months.

***Task 2.3 Pilot PERSEIA scaled up into informal context: implementation in science museums***

No activities have been developed in this period. This task will initiate in Month 30, as planned in the DoA.

### 1.2.3 Work Package 3 (WP3): Building science education and communication capacity for teachers and early career researchers

As WP3 leader **UoB** took the lead in organising and developing a set of activities aiming to identify key skills, knowledge and methodological approaches to foster secondary school teachers' and early career researchers' competences to be engaged in performance-based activities to motivate students for research (Task 3.1). In this context informal conversations were hold with teachers and early career researchers and a five-day workshop with consortium members was organized to share skills and knowledge on capacity building for science communication and education. The results of this meeting contributed to the achievement of **Milestone 1** in May 2016 (Month 7) on the selection of the specific training skills to be developed.

Based on this sharing process **UoB** organized a first round of trainings for early career researchers in the three different countries (Task 3.2). Fifty-six early career researchers were also recruited to participate in these trainings designed and implemented in Paris, Barcelona and Bristol in partnership with **AJA**, **UAB** and **UOC**.

In parallel **UoB** supported by **AJA**, **UOC, UAB** and **TBVT** started to work on the development of a training programme for secondary school teachers by sharing knowledge amongst consortium partners in face-to-face meetings, building on the knowledge gained from speaking to teachers involved in the project and education experts (Task 3.3). This allowed to define the needs and constraints that teachers faced in each country and to produce a tentative programme that could be attractive to them and realistic in terms of time commitment and recognition. A focus of these trainings is to ensure that they are adapted to local contexts and that each country delivers a programme that meets the needs of their local teachers and is attractive and realistic in terms of time commitment and recognition.

### *Task 3.1 Development of knowledge sharing workshop on performance-based activities and RRI values*

**UoB** organised the **knowledge sharing workshop** in Bristol, April 4th-8th 2016, with the support of **UOC** and **UAB** who provided inputs for the workshop design. **UoB** put together the workshop based on the partners' expressed needs and also on the expertise on capacity building for strengthening science communication and education the consortium could share, including skills and RRI values, which would be beneficial for PERFORM. In doing this, **UoB** led discussions and debates about topics from participation to reflexivity in which **AJA**, **TRACES**, **SMS**, **TBVT**, **UNESCO**, **UoW**, **UAB** and **UOC** actively participated.

Specifically, **UoB** organised a two-hour session on participation and engagement within the workshop. In turn, **AJA** designed a three-day session for internal sharing of knowledge and ideas on reflexivity. This provided the consortium with a common understanding of the issues related to reflexivity as well as RRI, improved the capacities of all partners to communicate appropriately on the project as well as opened perspectives for performers to design PERSEIAs that addressed issues related to RRI and reflexivity with the public. In turn, **UAB** and **UOC** designed and facilitated a two-hour working session on RRI to foster an in-depth discussion among partners so as to facilitate a common understanding of RRI within the project (see Task 1.3). **UoB**, **AJA** and **UAB** provided resources for all partners to support continuous reflexivity for the next project activities. In another session, **TBVT**, **SMS** and **TRACES** presented initial results from the exploratory workshops conducted in Spain and got feedback from partners (see Task 2.1). **TBVT**, **SMS** and **TRACES** also scheduled the activities to be developed at the schools during the following months with the other partners and shared ideas for the development of their future PERSEIAs.

During the workshop **UoB** also organised discussions with early career researchers interested in being further involved in the PWs at school to support students in producing their PERSEIAs (see Task 2.2). Discussions with the teachers took place independently at secondary schools participating in the exploratory workshops (Task 2.1).

A summary of the knowledge sharing workshop was produced, and **UoB** completed the transcriptions of the workshop and conversations that were useful for the development of trainings (Tasks 3.2 and 3.3). This workshop thus helped **UoB** start to identify the training that both researchers and teachers might need in order to improve their communication and engagement skills and participate in PERSEIAs. **UoB** based on this work to achieve **Milestone 1 in May 2016** (Month 7).

### *Task 3.2 Development of training and guidelines for researchers*

After the discussions with early career researchers and based on the topics discussed during the knowledge sharing workshop, from May to September 2016 (Months 7 to 11) **UoB** together with **AJA**, **TRACES**, **UAB** and **UOC** selected the topics to be tackled in the trainings for researchers and designed the format for each case study. The training in the different countries was adapted to take into account local needs and the existing training and institutional infrastructures, to design something that had the potential for sustainability beyond the scope of the project activities.

The first of two phases of training for early career researchers took place in France in November 2016 (Month 13), in Spain in December 2016 and January 2017 (Months 14 and 15) and in the UK started in January 2017 (Month 15) and will finish in April 2017 (Month 18). **Three early career researchers in France, 45 in Spain and 8 in UK participated in this first training phase**.

In France, given the already wide range of engagement training available to researchers in the French system, **AJA** delivered a three-day intensive course focused on developing reflexivity on one's own research practice (Table 6).

*Table 6*. Programme of the early career researchers' RRI training in France (December 2016-March 2017).

| **Topic (partner delivering)** | **Date and time** | **Brief description** |
|---|---|---|
| Reflexivity in science for a responsible communication of science - Strengthen the educational outreach of your academic activity (AJA) | 21/11/2016, 13h15-16h30 | *RRI, your interpretation:* From scratch, how do you interpret the RRI expression? In what sense is your research practice responsible?<br>*Being transparent on your research. Tell us:* What are the epistemic challenges you face? Who is your academic community? Where is your research situated in terms of history of your discipline? What are the institutional/organizational obstacles you face? What are the funding schemes for your research? What are the sources of reliability in the specific research methods you employ? |
| | 22/11/2016, 8h30-15h | *Normative aspects of RRI:* Read European + French codes of conduct. What are the deviation to the norms?<br>*Values in research:* Read Merton 1942 paper and comment. Read the slow science manifesto. Write your own manifesto!<br>*Feminist epistemology: situated knowledge, standpoint theory and strong objectivity:* Based on this approach of STS, declare you own standpoint.<br>*Get to know your public:* Science communicators present the schools' social and economic backgrounds. Literature is cited, which explores (often failed) attempts of more inclusive science education and science communication. |
| | 23/11/2016, 8h30-15h | *Imagine a collaboration artists and researchers:* Researchers and artists imagine how to frame into performances some key aspect of the (reflexive) human dimension of research experienced by the early career researcher. |

The training was offered to early career researchers via an agreement with one graduate school (Frontières du Vivant) and two multi-university networks (Paris Science Lettres and Sorbonne Paris Cité - CFDIP) in Paris. The three early career researchers taking part will officially validate PERFORM training hours as part of their PhD training. **AJA** organised training logistics in terms of location and dates and worked with **TRACES** to facilitate the collaboration between them, and with the researchers at the schools. **TRACES** artists also took part in the training to initiate interactions with the early career researchers prior to implementing the activities in the schools. **UoB, UOC** and **UAB** attended some of the training sessions in order to learn and feed in to their own training for researchers, as well as to evaluate the sessions. Based on this experience, **AJA** provided feedback and advice to **UoB**, **UAB** and **UOC** on the development of the training sessions for researchers in Spain and UK.

In Spain, **UOC** and **UAB** designed a 15 hour training programme, together with colleagues at **UoB** and **AJA** (Table 7).

*Table 7*. Programme of the early career researchers' RRI training in Spain.

| **Topic (partner delivering)** | **Date and time** | **Brief description** |
|---|---|---|
| Science with and for society (UAB, UOC & TBV) | Theoretical session: 14/12/2016, 16h-18h<br>Practical session: 14/12/2016, 18h-19h | *The Responsible Research and Innovation (RRI) approach and values:* What, why and how?<br>*The PERFORM project:* stand-up comedy in science communication and education. Information on the project and the apprenticeship. |
| Key competences for engaging with society (UoB) | Theoretical session: 11/01/2017, 16h-17:30h<br>Practical session: 11/01/2017, 17:30h-19h | *Engagement and participation:* Collaborative approaches to science communication and education, inclusiveness and constructive dialogue. |
| Philosophy and ethics of science (UoB) | Theoretical session: 19/01/2017, 16h-17:30h<br>Practical session: 19/01/2017, 17:30h-19h | *Philosophy of Science:* can we define the scientific method? What makes good science? The problem of public trust in science.<br>*Ethics in scientific research and communication:* What is responsibility? Who are we responsible to? Funding, methods, outputs and risks. |
| Towards practice (AJA) | Theoretical session: 26/01/2017, 16h-19h<br>Practical session: 27/01/2017, 16h-19h | *Communication skills for researchers:* What is responsible communication? How to make my PhD understandable?<br>*Practising responsible science communication:* How to plan, initiate and scale up activities that communicate about the social dimension, norms and values of our local / disciplinary scientific community. Reflections on the PERFORM project and next steps. |
| Apprenticeship (TBVT) | During participatory workshops at selected schools | Interacting with and supporting students in dealing with scientific contents for the creation of their PERSEIAs. |

Since April 2016 (Month 6) **UOC** and **UAB** held meetings with the Institute for Education (ICE, Catalan acronym) at the **UAB** to establish the needs of students, the most useful topic areas and

the logistical arrangements. The Head of Strategic Projects within the Research Executive Administration of the **UAB** also joined the process to establish synergies with other **UAB** university trainings and foster its sustainability after the PERFORM project. Following the advice of the Institute for Education at **UAB**, the training was designed to ensure that all interested researchers could attend, since RRI trainings were not yet established at Catalan universities. As such the training consisted of four 90 minutes theoretical plenary sessions offered to PhD students and postdoctoral researchers from across the **UOC** and **UAB** and other Catalan universities, and four 90 minutes practical sessions open to those researchers interested in being actively involved in PERFORM PWs (see Task 2.2). The programme included a range of RRI aspects (delivered by **UOC/UAB**), engagement and philosophy of science (delivered by **UoB**) and reflexivity (delivered by **AJA**).

**UAB** took care of logistical arrangements and room bookings for the training in Barcelona, with the support of its Institute for Education and Head of Strategic Projects within the Research Executive Administration. It was launched at the **UAB** website in November 2016 (Month 13) with their logistical support to spread the call, manage inscriptions and provide training spaces within the **UAB** during December 2016 and January 2017 (Months 14 and 15): http://www.uab.cat/web/estudiar/doctorat/activitats-programades/recerca-i-innovacio-responsables-com-maximitzar-l-impacte-local-de-la-meva-recerca-1345715344954.html). A total of **45 students** participated in the theoretical training (one or more sessions), while **12 students** took part in the practical training by attending two or more sessions (Figure 4).

*Figure 4*. Group discussion in session 1 of the training to early career researchers in Spain.

**UOC** and **UAB** supported **UoB** in monitoring the training in Spain by recording observations in the observation form developed by **UoB** and preparing a feedback form to be delivered to participating researchers.

In the UK, **UoB** worked with their training specialists and with the Bristol Doctoral College to find ways in which to make the training attractive to early career researchers, bearing in mind the amount of training that was already available beyond PERFORM. **UoB** used a cohort model of training, providing a wide and holistic body of knowledge and preparation for engagement work in general, as well as involvement in the participatory process that this project is exploring. The

programme was designed and appropriate speakers were booked under the various topics. The key areas of interest in the UK training were philosophy and ethics of science, communication skills, working with schools and children, and practical and theoretical approaches to RRI. In September 2016 (Month 11) **UoB** participated in the H2020 RRI-Tools project symposium "RRI in the UK: the post-BREXIT future" at University College London, attended by some of the leading academics working in RRI in the UK, in order to gauge the contemporary understanding and integration of RRI in the UK academic context.

Advertising for early career researchers to join the cohort in Bristol began in October 2016 (Month 12). The cohort was finalised in December 2016 (Month 14) with a kick-off meeting held to introduce researchers to each other and to key **UoB** staff in order to welcome them to the project. The first early career researcher training took place in January 2017 (Month 15) and focused around working in schools and with young people, plus information about the project and the role of early career researchers in the workshops (Table 8). The training session was delivered by **UoB** colleagues with experience in education, and **SMS** (see Figure 5).

*Table 8*. Programme of the early career researchers' training in the UK.

| **Topic (delivering partner)** | **Date and time** | **Brief description** |
|---|---|---|
| Working in schools (UoB) | 18/01/2017, 13h-15h | *Exploring science education curriculum in British schools & pertinent issues to bear in mind when working in them as researchers.* |
| Science busking training (SMS) | 01/02/2017, 13h-15h | *Understanding and practising the science busking approach that SMS use to communicate science to children.* |
| Communicating your topic (UoB) | 01/03/2017, 13h-15h | *Exploring the skills and knowledge needed to communicate complex research topics to non-expert audiences.* |
| Responsible research and innovation (UoB) | 08/03/2017, 13h-15h | *Exploring RRI, what it is, where it came from, and what it means for the practice of science and its relationship to society.* |
| Science and society (UoB) | 15/03/2017, 13h-15h | *Exploring scientific realism, reliability and the post-fact society, examining scientific literacy in the general population and the impact this has on the way the public respond to and understand scientific progress.* |
| Ethics in science (UoB) | 22/03/201, 13h-15h | *Using geoengineering as a lens to examine ethics in science and our moral obligations as scientists within it.* |
| Reflection (UoB) | 05/04/2017, 13h-15h | *Reflecting on the experience of being involved with the PERFORM project – how we might evolve the project from the early career researcher perspective in year 2, and how the project might impact on the early career researchers own work in the future.* |

**UoB** took care of the logistical arrangements and room bookings for the training. Furthermore, connections were made with university departments working in relevant areas, such as the UoB-wide doctoral college, research staff development team, and expertise within a range of academic

departments, such as Department of Philosophy, Centre for Science and Philosophy, Graduate School of Education, and Schools University Partnership Initiative. The building of this network was intended to support the sustainability of the training, and to embed it into the life of **UoB** beyond the end of the PERFORM project and funding.

*Figure 5.* Early career researchers receiving science busking training from SMS.

### *Task 3.3 Development of training and guidelines for teachers*

In May and July 2016 (Months 7 and 9) **UoB** held meetings with teachers from target schools to explore the opportunities and needs for training, which were quite different in each school. Feeding on from these conversations, similar conversations were held in France and Spain between teachers and **TRACES**, **UAB**, **UOC** and **TBVT** to establish the regional needs and desires for similar training.

In France **TRACES** worked on a proposal to deliver performance training as part of the French system of official teacher training, which was submitted in January 2017 (Month 15). **AJA** shall contribute to deliver the contents. However it is very difficult to get training admitted into the official training programmes, and only small numbers of the proposed courses are accepted. If the training is not accepted in the official training programme, **TRACES** will deliver some more informal training to targeted teachers.

In Spain, between July and September 2016 (Months 9 and 11) **UAB**, **UOC** and **TBVT** worked with **UAB** Institute of Education to develop a training programme for teachers which will be delivered by **TBVT** within **UAB** Institute of Education's summer school for secondary school teachers in July 2017 (Month 21) as part of the Catalan system of official teacher training. From October 2016 to January 2017 (Months 12 to 15) **UoB, TBVT, UOC** and **UAB** worked together to develop topics that respond to the teachers' needs in the Spanish education context. **TBVT** with the support of **UOC** prepared the documentation and contents for advertising the training.

In UK, **UoB** had discussions with teachers from target schools about their training needs and interests. In November 2016 (Month 13) **UoB** met **TRACES** and discussed their teacher training experience to help refine ideas for the UK training. **UoB** will be arranging a range of training opportunities across RRI, philosophy of science and performance skills in 2017 following months.

### 1.2.4 Work Package 4 (WP4): Impact assessment of the participatory educational process in students' engagement in and learning about science

As WP4 leader, **UAB** coordinated the design and implementation of activities contributing to the development of an innovative and participatory methodology for the impact assessment of the participatory educational process in motivating secondary school students for STEM. With this aim **UAB** and **UOC** conducted a **systematic literature review** on transdisciplinary assessment frameworks applied in science education and **13 exploratory workshops**, with the support of **TRACES, SMS**, **UoW** and **TBVT,** in selected schools in Spain, France and UK (Task 4.1). Results from these exploratory workshops were returned to the participating schools, as a means of including students in the analysis process, by receiving feedback to the participatory indicators proposed, and keeping them updated in PERFORM further developments. As a result, a battery of indicators for assessing cognitive and experiential learning aspects, as well as transversal competences and RRI values, were identified and included in **Deliverable 4.1 Research report: Methodological aspects of science education assessment** timely submitted in May 2016 (Month 7).

During this reporting period, **UoW** started to prepare data collection parameters for the evaluation of the PERSEIAs social media based impacts on secondary school students' engagement in science during the participatory educational process (Task 4.2).

Also in this period, **UAB** with the support of **UOC**, **TBVT, TRACES** and **SMS** also designed the **assessment strategy to examine the participatory educational process** that started in January 2017 (Month 15) in secondary schools in the three cases studies (Tasks 4.3 and 4.4). Such design included both the global strategy – including the specific implementation calendars in each case study, as well as the development of the assessment methods and some of the specific tools to be applied. In order to do so, **UAB** built upon the assessment criteria and indicators previously identified in Task 4.1.

#### *Task 4.1 Development of an innovative and participatory impact assessment research methodology*

From November 2015 (Month 1) **UAB** and **UOC** worked together in a systematic literature review of academic articles on science education assessment. These included educational psychology, science communication, sociology, performance-based approaches, among others, to identify expert-based indicators and criteria to be used in PERFORM to assess students' changes in science learning and engagement as a result of their participation in the development of performance-based science education methods. **UoW** contributed with some feedback to the methodological design, proposing adjustments and additional requirements.

**UAB** and **UOC** conducted the literature review using Scopus as search engine and identifying a final relevant sample of **67 scientific papers and book chapters**. The sample was analysed so as to identify and characterize assessment frameworks used in the context of science learning and engagement with young people, with an emphasis on RRI values and process requirements, transversal competences and experiential aspects. As a result of our literature review, a set of **86 assessment indicators emerged**, related to RRI values, transversal competences and experiential and cognitive aspects of science learning and engagement.

Preliminary results from this reviewed **were published by UAB and UOC in open access in the conference proceedings** of the 1st HEIRRI project conference celebrated in March 2016 (Month 5):

- Heras, M., Ruiz-Mallén, I. 2016. Performing RRI in science education: How to measure the impact? In p. 22: *Book of abstracts: 1st HEIRRI Conference, Teaching Responsible Research and Innovation at University*. Fundació Bancària "la Caixa", ISBN: 978-84-9900-157-9.

Between March and May 2016 (Months 5 to 7) **UAB** and **UOC** supported by **UoW**, **TRACES**, **TBVT** and **SMS** designed and conducted exploratory workshops with students aimed to early engage and include them in the development of the assessment methodology. Eleven workshops were implemented with **a total of 161 secondary school students** in the schools involved in Task 2.1: **65 students in four schools in Spain, 57 students in four French schools and 39 in three schools in the UK**. Through these workshops, **UAB** and **UOC** collected students' perceptions on science education activities so as to identify participatory indicators to be included in the methodology and thus complementing the expert-based indicators identified in the literature review. A total of **15 indicators**, 7 of them not previously identified in the literature review, emerged from these exploratory workshops conducted with students in the three case studies.

These findings are included in the **Research report 'Methodological aspects of science education assessments' (Deliverable 4.1)** led by **UAB**, co-authored by **UOC,** peer-reviewed by **TBVT** and **UoW**, and timely submitted in May 2016 (Month 7). The report aimed to identify those individual, contextual, and methodological factors contributing to or detracting from the impacts of the participatory learning process in which secondary school students will be engaged to create PERSEIAs (Task 2.2). It contained all the insights of the literature review and the exploratory workshops in terms of key methodological aspects of PERFORM project. More specifically, it described **the battery of 32 assessment criteria and 93 expert-based and participatory assessment indicators** related to RRI values, transversal competences and experiential and cognitive aspects of science learning and engagement to evaluate PERFORM participatory educational process. This report also reflected upon the main implications for the methodological development of PERFORM's assessment and identified specific methodological aspects and challenges to be addressed in each specific case study.

In September and October 2016 (Months 11 and 12) findings from this report were included by **UAB** and **UOC in research articles** and submitted to international peer-reviewed journals by the authors. Both are currently under review and, if accepted, will be published in open access:

- The first article, entitled *'Responsible Research and Innovation Indicators for Science Education Assessment: How to Measure the Impact*?' systematically reviews and critically analyses science education impact assessments under the lenses of RRI criteria. As a result, key RRI assessment indicators in science education related to RRI values, transversal competences and experiential and cognitive aspects of learning are identified and discussed. This article was submitted to the International Journal of Science Education (Q1, IF: 1,85). In December 2016 (Month 14) the article was returned with major revisions and **UAB** supported by **UOC** submitted a revised version of the manuscript.
- The second article is entitled '*Can digital media and arts support Responsible Research and Innovation in science education? A systematic literature review*' and it reviews previous evidence on the assessment of science education activities using digital media and/or arts-based methods, from primary to high-level education, in order to examine if and how RRI values and related learning outcomes are addressed. Results are discussed in terms of the opportunities and challenges to enhance the use of digital and arts-based methods to support RRI values within science education practice. It was submitted to Thinking Skills and Creativity (Q1, IF: 1,022) and is under review.

Also, results of the exploratory workshops analysis were returned to nine of the 11 participating schools by **UAB**, **UOC**, **TRACES** and **SMS** between May and September 2016 (Months 7 and 11). In all cases, partners took advantage of the delivery of the pilot PERSEIAs generated within Task 2.1 in each of the participating schools, to also share the return of results. This feedback promoted discussion with students on the appropriateness and relevance of the participatory indicators identified, and engaged them in the project through the whole evaluation process. Although the results' return was developed taking into account specific contextual possibilities and constraints,

a general structure was designed for the three case studies. The return session globally consisted of: i) a brief explanation of the development of the 11 exploratory workshops in the three countries, the analysis and the identification of indicators; ii) a review of the most relevant indicators identified in the workshops; iii) an exploration of students' degree of agreement to each group of indicators; and iv) an explanation of the usefulness of such exploratory workshops and indicators and students' contributions, by contextualising them in the PERFORM project (i.e. the development of innovative educational policies and methods). In Spain, **UAB** and **UOC** created a wall mural that was shared with students in order to facilitate the visual identification of the participatory indicators. Students reacted positively to the indicators shared, showing their agreement and identification with the results. Students were also especially enthusiastic about the possibility of contributing to European policies through their participation in the project (Figure 6).

In France, at the end of the representation of each PERSEIA, **TRACES** engaged in a discussion with the students. **TRACES** answered students' questions about the show and explained the research work carried out in the previous months. They also shared the different indicators emerging from the exploratory workshops conducted in France, UK and Spain and asked students for feedback. Similarly, in UK **SMS** shared the results of the exploratory workshops following the PERSEIA delivery. During feedback, students showed themselves to be particularly interested in results' differences among the different countries.

**SMS** could not deliver the exploratory workshop in one of the three participating schools and could not return the results in another school due to the termination of their involvement in the project (see Deviations 5.1 section for more details). Therefore, it was agreed that results would be shared with the two new participating schools during the delivery of the pilot PERSEIAs. The sharing of results to Broadlands Academy secondary school already took place in October 2016 (Month 12), while it is a pending issue in the a fourth school recently recruited (Bridge Learning Campus).

*Figure 6.* Return of results in the IES Consell de Cent secondary school in Barcelona.

### *Task 4.2 Evaluation of the social media-based impacts of the performance events on young people's engagement in science*

During the reported period, **UoW** started to set up the data collection parameters for social media data harvesting on relevant platforms and the preparation of an automated analysis tool to evaluate the feelings, perceptions and attitudes towards science and researchers of the students involved in the PWs (Task 2.2), and their views about the appeal of scientific careers. The platforms were targeted based on advice from **TBVT** as WP2 leader, resulting in the identification of Twitter and Instagram, through the accounts *@performstem* and the hashtag *#performstem*. Between October 2016 and January 2017 (Months 12 to 15) data were collected based on the relevant hashtags and handles made so far. **UoW** began to set up a dashboard with automated analysis and storage of social media data available for download and further analysis. The data were visible in the dashboard as they came in. This content was captured for future analysis, which will commence on a pilot basis once a good amount of data (ideally at least 500 tweets) are collected. Screenshots to show what part of this data looks like can be seen in the image below (Figure 7).

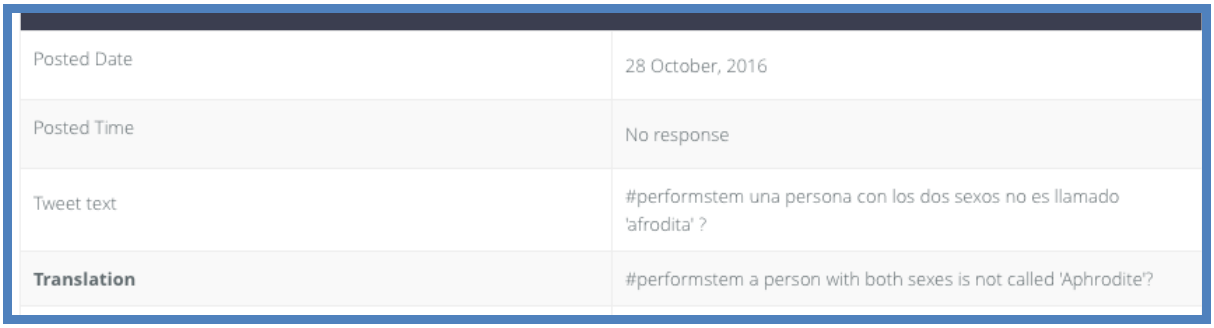


*Figure 7.* Screenshot of Twitter.

In November 2016 (Month 13) **UoW** engaged in online conversations with **TBVT**, **TRACES** and **SMS** in order to ensure a proper adaptation of the methodology proposed to the school context of those schools involved in the PWs (see Task 2.2). Such feedback will be incorporated as a critical input in the design of the evaluation strategy of social media-based impacts. For instance, **SMS** expressed concerns regarding the use of social media and online systems to interact with students in and outside schools. These were mainly related to the legal and ethical aspects: i) social media sites such as Twitter have an age limit of 14 and the students in the UK are 13-14 years old, therefore are not all old enough to legally be on social media sites; ii) schools are often trying to teach safeguarding online to their students; iii) by encouraging the use of social media, especially to interact with people they do not know, case study coordinators could risk going against school policies; and iv) there are many ethical issues surrounding online interaction with minors and both **SMS** and **UoB** were not comfortable with the proposed approach due to such legal and ethical concerns.

Consequently, from November 2016 to January 2017 (Months 13 to 15) several face-to-face and online meetings and exchanges between **UoW**, **SMS**, **UOC** and **UAB** took place to provide a tailored solution to UK's specific context. During the PERFORM consortium meeting in Paris in November 2016 (Month 13) it was agreed by the involved partners that the contingency plan written in the DoA would be followed. Such plan considers **UoW** interviewing UK students instead of using social media-based methods. Accordingly, during November and December 2016 (Months 14 and 15) **UoW** re-oriented the research design work for the UK context and prepared a detailed implementation strategy based on the contingency plan included in the DoA as well as in the PERFORM Risk management plan (Deliverable 1.3).

In the French case, during January 2017 (Month 15) **TRACES** met the school teachers involved in the first round of PWs in order to discuss with them the feasibility of social media-based interaction with the students. In Collège Marie Curie they agreed to use a secret Facebook group; while in Collège Les Toupets they agreed to use the school's online platform (Moodle) and, eventually, also a blog. Regarding students' use of social media-based platforms, teachers raised their concerns about students publicly commenting on each others' performance during the PERSEIA. Teachers agreed to use anonymised post-it notes to have feedbacks instead. Finally the possibility of conducting interviews with selected students like in the UK case was also discussed and it was agreed by **TRACES** and **UoW** that face-to-face interviews will be also conducted in Paris in (avoiding the use of phone or Skype).

### *Task 4.3 Evaluation of the acquisition of transversal competences by students during the educational process*

From September to December 2016 (Months 11 to 14) **UAB** led the design of the assessment strategy and tools with the support of **UOC**. Such strategy includes the assessment of the impact of the participatory process in promoting students' acquisition of transversal competences and skills that will allow them to engage in scientific ideas and practices. Such strategy consisted of a mix-methods approach, triangulating systematic observation of the PWs, interviews to teachers and early career researchers with deliberative focus groups with secondary school students to analyse their perceptions and skills to STEM and study related careers.

During Task 2.2 PWs initiated in January 2017 (to take place until May 2017) (Months 15 to 19) **systematic observation** is being conducted by **UAB, UOC** and **UoB** in order to capture and retain students' experiences and appreciations along the participatory educational process in each case study. A structured observation guide was developed in order to ensure a systematic observation procedure among **UAB, UOC** and **UoB** researchers. The guide provided clear observation guidelines and structures the data to be gathered around two main dimensions: i) the general setting of the PWs (e.g. teacher attending, number of students by gender, number of early career researchers), and ii) the development of the students' learning process (including the way RRI values, transversal competences and experiential factors are addressed). As part of the learning process, the guide included more than 10 assessment indicators addressing transversal competences and skills related to students' capacity of learning to learn (e.g. understanding the value of learning, learning autonomy and reflective thinking), social and civic competences (e.g. communication skills, collaborative skills, ability to resolve conflicts), and sense of initiative (e.g. entrepreneurship, ability to plan and manage projects). As part of the observation methodology, **UAB** and **UOC** also elaborated formal guidelines for recording audio-visual material from the PWs, to have formal data recorded in video and audio formats so as to be able to compare changes over time and track processes within (e.g. decision-making or gender-balanced participation). These guidelines were elaborated to ensure that data are recorded under the best conditions and respecting the accomplishment of PERFORM's ethical guidelines. A follow-up document was elaborated for **TBVT**, **TRACES** and **SMS** performers facilitating the workshops, in order to record participants' assistance and accomplishment of homework.

To triangulate data sources while increasing the probability of in-depth understanding of the learning process, the designed assessment strategy included **focus groups** with selected secondary school students as well as interviews to teachers and researchers involved in the process. Focus groups will contribute to explore in detail students' transversal competences gained during the process. Furthermore, face-to-face interviews and online surveys will contribute to triangulate such data by also exploring teachers' and researchers' views on students' attitudinal changes and skill improvement at school, as a consequence of their participation in the PERFORM project. A specific assessment sheet for each of these methods was elaborated during September 2016 (Month 11), specifying: i) definition and goals, ii) implementation strategy, and iii) related assessment tools to be developed. However, the

specific design of the focus groups and the interviews will take place during the development of the participatory educational process in each case study in the following months as their design is informed by outputs from such process. As explained below, the assessment strategy related to transversal competences, including a detailed implementation calendar, was agreed with case study coordinators to ensure a proper coordination of its implementation, as well as the adaptation of the methodology to each school context and to the specificities of the PWs in each case study.

In November 8th 2016 (Month 13) and taking advantage of PERFORM's consortium meeting in Paris in the same month, **UAB** supported by **UOC** coordinated a one-day assessment meeting with all case study coordinators. The aim of the meeting was to share and discuss the assessment strategy related to transversal competences and RRI values, previously sent via email by **UAB** in order to incorporate case study coordinators' feedback to ensure a proper coordination of its implementation, as well as the adaptation of the methodology to each case study and school context. The meeting was held at TRACES headquarters and was attended by **SMS**, **TRACES** and **TBVT**. First, the assessment strategy was presented in terms of global focus and target, specific data collection instruments (i.e. structured observation, students surveys, formative evaluation and focus-groups, and teachers' interviews), and implementation time frameworks. Feedback from case study coordinators was provided to ensure coherence of the assessment strategy with PERSEIA's goals and focus, to clarify doubts on the tools, and to share any concerns and/or improvement suggestions. The assessment implementation was then specifically discussed case per case, in terms of feasibility and definition of an implementation calendar and the distribution of tasks among partners in each case study was agreed between **SMS**, **TRACES**, **TBVT**, **UAB** and **UOC**. For Spain and France, **UOC** and **UAB** implemented the assessment strategy with logistic support from local case study coordinators (**TBVT** and **TRACES**), while in UK **UoB** helped with the observation of the process and the focus groups. Regarding students' surveys (see Task 4.4) the pre-survey was conducted during PW1 in the three case studies, in order to facilitate its implementation. Furthermore, **UAB** designed an exercise of formative evaluation (i.e. students' learning chart) in the protocols of PW1, 3 and 6. In the case of UK, such learning charts were implemented by **SMS**, while in France and Spain **UAB** and **UOC** implemented them with support from **TRACES** and **TBVT**.

After the meeting **UAB** supported by **UOC** adapted and refined the assessment tools designed, so as to respond to each case study needs and context. A new version of the structured observation guide was prepared, together with an Excel sheet to systematize the observations of the workshops in the three case studies. This new version was shared and discussed with **UoB** in January 2017 (Month 15), prior to the beginning of the PWs.

In the case of Paris, **UAB** visited Marie Curie secondary school during PW1 and conducted structured observation with the involved students. The workshop was recorded, following the audiovisual recording guidelines. In Collège Les Toupets, **UAB** was supported by **TRACES** to conduct observation in one of the groups. Afterwards, **TRACES** processed and sent the observation notes to **UAB**, so to be analysed. **TRACES** also provided the cameras for video-recording. In the case of UK, **UoB** carried out the observation of PW1 and 2 in Fairfield High School. Following advice from **UoB** and **SMS**, these PWs were not recorded. In the case of Spain, **UAB** and **UOC** conducted observation during PW1 and carried out the pilot and pre-survey at INS Santa Eulàlia. In all cases, partners followed the structured observation guide and the audiovisual recording guidelines.

Furthermore, weekly online meetings starting in late January 2017 (Month 15) were set between **UAB** and **UOC** during the implementation of the PWs. These meetings were set to ensure coherence in data collection along case studies, and the adaptation of observations to the development of the PWs, being responsive to the insights and data collected through the educational process. As a result, for instance, the structured observation guide was reviewed again and slightly refined by **UAB** after PW1 in Paris, in order to include two more variables and better adjust it to the PWs' design.

### *Task 4.4 Assessment of the Responsible Research and Innovation values*

The assessment strategy designed by **UAB** supported by **UOC** (see Task 4.3) also included the evaluation of the capacity of the participatory educational process developed in Task 2.2 to transmit the RRI values through the resultant science performances. Specific tools were designed to measure the impact of this process RRI approach in students' attitudes and pro-scientific behaviour and learning. A survey was designed through the development of two self-administered **surveys** to be implemented prior and after the Task 2.2 process. The objective of the surveys was twofold: i) to examine initial attitudes and perceptions towards science and STEM careers, with an emphasis on RRI-related dimensions (i.e. gender stereotypes, ethical issues, inclusiveness, engagement and critical/creative thinking), and potential changes after the implementation of PERSEIAs; and ii) to examine participants' perceptions towards the PERSEIAs co-creation process, also as an input to inform the design of the focus groups. Additionally the surveys included items about students' socio-economic profiles.

The survey design included the development of a pilot to test the tool in each case study before its implementation in order to ensure that the items were properly adapted to the school context and internally coherent. A pilot session was designed in order to facilitate a focused discussion with the sample of students answering the pilot. In December 2016 and January 2017 (Months 14 and 15), **UAB** (with the support of **TBVT**), **TRACES** and **SMS** conducted the pilot sessions with a group of students not involved in Task 2.2 in one school in each case study. Students' responses and feedback in the discussion session was analysed in terms of survey's item reliability, construct validity and time required to answer.

To triangulate assessment methods, the designed RRI assessment also included the development of structured observation, focus groups and interviews (see Task 4.3). Structured observation was and will be conducted during selected PWs and it is focused on the accomplishment of RRI-related process requirements. Following such aim more than 15 indicators were included in the observation guide, related to the inclusiveness of the process, its capacity to foster students' engagement and critical thinking, and the inclusion of ethical aspects. Furthermore, **UAB** with the support of **UOC** elaborated the guidelines for the assessment of the students' final performance resulting from their PERSEIA co-production process. Such guidelines included observation criteria to assess both the capacity of the performance to combine scientific content and RRI values as well as its aesthetic quality. Focus groups and interviews will be conducted after Task 2.2 PWs. Focus groups will provide in-depth data about students' RRI-related perceptions and attitudes broadly examined in the survey, allowing researchers to enlarge their understanding about relevant results of the survey and to explore participants' subjective experiences of the participatory process. Informal and formal interviews will contribute to triangulate RRI-related data by also exploring teachers', researchers' and performers' views on the participatory process. The focus of such interviews includes the involvement of researchers and their interaction with students, as well as the perceived strengths and limitations of the process.

As described in Task 4.3, the assessment strategy related to RRI values was agreed with **TBVT, TRACES** and **SMS** to ensure a proper coordination and adaption to each school context. In November 2016 (Month 13) after the assessment coordination meeting **UAB** supported by **UOC** refined the students' pre-survey and a revised version was shared with case study coordinators. In the UK, this version was reviewed by **SMS**. A pilot test was designed as a 45-minutes session consisting in the administration of the survey to students -previously contextualised within the project (20 minutes), followed by an informal group debriefing (20 to 25 minutes). The debriefing explored to which extent questions were easy or hard to both understand and answer by the students, identifying together potential alternative formulations in those cases in which the questions or guidelines were not properly understood. During November and December 2016 (Months 13 and 14) the students' survey was piloted in each case study in order to test its length and to ensure that the items were properly understood by the students (i.e. item reliability). In Spain, during November 2016 (Month 13) **UAB** with the support of **UOC**

coordinated and implemented the pilot test in IES Consell de Cent in Barcelona (18 students). During the same month, the pilot test was implemented by **UAB** in Collège Marie Curie (6 students) with the support of **TRACES**, who provided the school contacts. During December 2016 (Month 14) the pilot test was implemented by **SMS** in Birkenhead School (17 students), following the same protocol. Results were shared online with **UAB** by **SMS**, so as to incorporate them in the analysis. Based on the analysis of results from the three pilot tests **UAB** with the support of **UOC** adapted the pre-survey. A final version was sent to case study coordinators at the beginning of January 2017 (Month 15) before the implementation of the PWs.

During the first weeks of January 2017 (Month 15) **UAB** with the support of **TBVT** in Spain and **TRACES** in France coordinated the logistics of students' pre-survey with the participant and control groups in both case studies, which were conducted before the PW1. In the case of France, these surveys were implemented by the teachers in coordination with **UAB** researchers. In the French case, **UAB** conducted the survey in both groups in Marie Curie secondary school whereas **UAB** and **TRACES** conducted the survey to participants and teachers to the control group in Collège Les Toupets. In the case of Spain, **UAB** and **UOC** conducted the pre-survey with students participating in PERFORM and carried out the observation and the learning chart, as well as the survey with the control group, at INS Santa Eulàlia. In the case of UK, an online meeting was previously held between **UAB**, **UOC**, **SMS** and **UoB** to discuss the implementation details prior to the PW1 in Fairfield High School. **SMS** conducted the pre-survey, together with the learning chart and, with the help of **UoB** and the teachers, implemented the survey to the control group. During this online meeting the post-survey completion was also discussed and a date was set. The focus groups were also discussed and **UoB** suggested hosting them at the university so that the students could also visit the campus and labs in May 2017 (Month 19).

### 1.2.5 Work Package 5 (WP5): Sustainability and Policy Impact

**UNESCO**, as WP5 leader, conducted relevant work in ensuring sustainability and maximizing the policy impact of PERFORM. **UNESCO** organised a series of internal and external meetings at UNESCO Headquarters with their colleagues from UNESCO Education sector and with representatives of Member States also at UNESCO to collect best practices and literatures as far as setting up a medium and long-term sustainability plan (Task 5.1).

Also, **UNESCO** participated and/or organised **6 policy events and science policy forums** focusing on science education or science communication to promote PERFORM and ensure the legacy of the project beyond the current EC funding (Task 5.2).

As a result of these activities, **UNESCO** identified actions for sustainability in **Milestone 2** in June 2016 (Month 8) and generated the **Sustainability plan in Deliverable 5.1** in January 2017 (Month 15).

#### *Task 5.1 Generation of a sustainability plan*

In June 2016 (Month 8) **UNESCO** timely achieved **Milestone 2** on the **Identification of actions for sustainability** by identifying and providing to the PERFORM consortium guidelines and good practices to be applied throughout the project to ensure its sustainability.

In order to achieve Milestone 2, **UNESCO** conducted a series of internal and external meetings to collect best practices and literatures as far as setting up a medium and long-term sustainability plan. Internal meetings were held with the following sections at UNESCO: Science Sector Executive Office, Section for Mobilizing Resources from Multilateral and Private Partners, Africa department Contextual Analysis and Foresight Unit, External Relation and Information of the Arab States Desk. External meetings involved the World Bank and the Inter-American Development Bank (see Task 5.2).

Work was carried out at this point of the project with UNESCO's colleagues from the Education sector and also with some representatives of Member States at UNESCO. The result of these series of consultations led **UNESCO** to identify key issues to be taken into account in the design of PERFORM's sustainability plan. These were: i) definition of the environmental support, ii) identification and mobilization of stakeholders (i.e. funding stability and partnerships), iii) definition of issues of organizational capacity, iv) evaluation and adaptation of a relevant participatory method, and v) definition of a strategic communication and strategic planning. These propositions were discussed by the consortium during the two-day meeting that **UNESCO** organized in Paris in November 2016 (see Task 5.2). As a result of this process, a list of the relevant resources on the use of science education using performing arts around the world along with examples of guidance for the construction of protocols for what should be the sustainability plan of PERFORM were available.

Based on this material, **UNESCO** generated and uploaded **Deliverable D 5.1 Sustainability plan** on the participant portal on January 2017 (Month 15). The goal of the PERFORM sustainability plan was to highlight the main actions to be undertaken by the PERFORM consortium in order to ensure the sustainability of the project and its findings after the end of the project in October 2018 (Month 36). The document identified three axes to ensure the sustainability of PERFORM. First, 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.

***Task 5.2 Maximize the policy impact of PERFORM***

During this reporting period **UNESCO** undertook several actions to maximize the policy impact of PERFORM. **UNESCO** to this end organised and participated to a series of meetings and conferences. For instance, in May 2016 (Month 7) **UNESCO** organised meetings with World Bank (Washington D.C, May 4th 2016) and the Inter-American Development Bank (Washington D.C, May 6th 2016). The goal of these two meetings was to present PERFORM and to establish synergies between PERFORM and the current science education projects running by these two financial institutions.

In the same vein and to ensure PERFORM's policy impact, **UNESCO** promoted and presented PERFORM at three European and international science policy fora:

- First annual Multi-Stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals (STI Forum) at the UN Headquarters in New York (USA), June 6th-7th 2016 (Month 8). The presentation of PERFORM was made during the side event called "From Science to Policy to Action - Promoting the Virtuous Cycle of STI for SDGs".
- EuroScience Open Forum (ESOF) in Manchester (UK), July 23rd- 27th2016 (Month 9).
- London International Youth Science Forum 2016 in London (UK), July 27th-30th2016 (Month 9).

In addition, **UNESCO** with the help and support of **UOC organized a two-day conference** with **all partners** to present and promote PERFORM to the representatives of **UNESCO**'s Permanent Delegation in Paris on the occasion of the World Science Day for Peace and Development (WSDPD) in November 2016 (Month 13). Established by UNESCO in 2001, the WSDPD is celebrated worldwide on November 10th each year. The day offered an opportunity to mobilize partners to highlight the important role of science in society and to engage the wider public in debates on emerging scientific issues and the relevance of science in their daily lives.

During the WSDPD, PERFORM meeting gathered at UNESCO Headquarters **about 80 secondary school children and 53 UNESCO permanent delegations** including France, Spain and USA

(Figure 8). A general presentation of the PERFORM H2020 funded project on enhancing young people's motivations for science through performing arts was made to the audience **by UOC** and **UNESCO** followed by three different performance shows based on stand-up comedy, clown and science busking (PERSEIAs) by **TBVT, TRACES** and **SMS**.

The public reception of the conference and the performances was highly positive and some delegates and representatives from different countries approached PERFORM in order to obtain further information and stay in contact with the project's coordination team. These are some of the collected reactions: *"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), *"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). Overall, PERFORM was perceived as a stimulating and innovative project to engage young students with STEM careers, developing their interest in science and raising up their will for questioning themselves about scientific topics, through an entertaining and attractive methodology.


*Figure 8.* Presentation of the PERFORM project to UNESCO delegates (top left) and a short PERSEIA based on science busking (top right) and Paris secondary school students attending the PERSEIA (bottom) at the WSDPD event.

For the months to come and as a follow-up of this first PERFORM conference, **UNESCO** will conduct a series of presentations of the PERFORM project to a variety of audiences starting with the six electoral groups of the UNESCO organization.

**UNESCO** is working on the first policy paper draft, which will be part of Deliverable 5.2 (Month 34), based on the above mentioned landscape analysis and meetings.

### 1.2.6 Work Package 6 (WP6): Dissemination and Outreach

As WP6 leader, **EUSEA** initially collected the needed information from consortium members in order to be able to design the communication strategy of PERFORM. More specifically, **EUSEA** initial actions focused on developing a general plan for the communication, dissemination and project results exploitation, designing the graphic identity of the project, and launching the main online tools to be used to implement the plan (Task 6.1).

The consortium then started to develop both online and offline actions to promote a participatory management of the project's communications tools. While **EUSEA** acted to collect information to update material, all consortium members started to promote online and offline actions aiming at sharing their activities on both media and social media, disseminating the content of the PERFORM project in international conferences and meetings (Task 6.2).

Attempts of encouraging the use of social media among secondary school students and teachers were also implemented by **TBVT**, **TRACES** and **SMS** while doing PERSEIAs (Task 2.1) and the PWs and students' co-produced PERSEIAs (Task 2.2) at schools. The production of material such as **eight short videos** also proved to be effective in terms of visualisation. In addition, **EUSEA** started the elaboration of the first external newsletter with the support of **AJA**, **TBVT**, **UoW**, **UAB, UoB** and **UOC** in January 2017 (Month 15).

The most important results achieved in this first reporting period were the elaboration of the **Plan for communication, dissemination and exploitation of the project as Deliverable 6.1** in February 2016 (Month 4), and the **launching of the PERFORM website and the online social media tools as Deliverable 6.2** in April 2016 (Month 6).

#### *Task 6.1 Communication Plan and Tools*

The PERFORM **Plan for communication, dissemination and exploitation** of results (**Deliverable 6.1**, Month 4, reviewed by **AJA**, **UNESCO** and **UOC**) was developed based on the decennial experience of the **EUSEA** network in reaching general public through events. Combined with this experience a constant dialogue with the PERFORM coordination team at **UOC** and the rest of the consortium took place during the beginning of the project aiming at collecting partners' expectations, needs and thoughts about the project itself and about the potential target groups to be reached. To nurture this dialogue, face-to-face meetings together with online meetings were organized to finalize the communication plan. Thanks to this information it was also possible to decide the launch of online tools that were not originally included in the DoA, namely the Instagram account, a more suitable online tool for secondary school students compared to other social media (see below).

Within the communication strategy three main contents were addressed. First, target groups for the PERFORM communication actions were identified, corresponding to the actors actively involved in each phase of the project: science teachers from secondary schools, researchers, performers or science communicators, event organizers in the educational and cultural field, and policy makers and other stakeholders. Additionally, key messages to reach each target group were identified in the communication plan, which also facilitated the definition of effective tools to convey them.

Second, **offline and online communication tools** were envisioned to convey the messages to the identified audiences in the communication plan. As for their implementation, **EUSEA** focused on developing the graphic identity of the project (i.e. the project logo and its different versions for different formats) and on implementing the online tools, such as the web presence and the use of social media tools that are a vital part of the dissemination of the project:

- The **PERFORM website** (www.performresearch.eu or www.perform-research.eu);
- The **Twitter account** (*@performstem*);

- The **Facebook page**(*www.facebook.com/performproject/*);
- The **Instagram account** (*performstem*);
- The **YouTube channel** (*Perform Research*).

Third, and in parallel, the **communication management structure** was established, in which the management was led by **EUSEA**, with a constant dialogue and support by the coordination team at **UOC**. In turn, each consortium partner identified a social media manager within its institution to use all the communication channels open, in coordination with **EUSEA** who managed the social media accounts. **UOC** specifically contributed to the management of PERFORM Facebook and Twitter accounts.

**EUSEA** created the PERFORM **website** with a public web and a private section (an intranet, described in Task 1.2). The public web was organized in 7 sections (home, about, toolkits, research, events, gallery, contacts), which were fed and updated during this period and will be during the rest of the project. In order to update the web content, **EUSEA** was and will be in constant communication with the coordination team at **UOC**, and together with all consortium partners, whose inputs were requested. Public PERFORM deliverables elaborated and approved in this period were uploaded at the website.

The **Website and the social media launch** were timely achieved in April 2016 (Month 4) as **Deliverable 6.2**. This deliverable was peer-reviewed by **SMS**, **TRACES** and **UOC**.

During November and December 2016 (Months 13 and 14) **UOC** and **EUSEA** translated the website fix content into French, Spanish and Catalan, so the **multilingual website** was launched by the end of January 2017 (Month 15).

Social media tools aim at increasing the number of connections and hence the visibility of the project, addressing different stakeholders among those highlighted in the communication plan: from policy makers to performers and teachers. The consortium was constantly feeding them with live report from the activities that were run within the project and since these activities were carried on by different partners the multiplicity of the voices involved in the social media life were also giving to the project communication a lively appearance on the web. For instance, in June 2016 (Month 8) **UAB** contributed to the online presence of PERFORM by producing a short communication about the exploratory workshops carried out and about the return of results on participatory indicators (Task 4.1). The aim of such communication was to inform the public about the specific developments of PERFORM project, while emphasizing its participatory dimension.

During PERSEIAs delivery in 35 schools (Task 2.1), **TBVT**, **TRACES** and **SMS** took pictures for social media and encouraged students to follow PERFORM on Twitter and Instagram and to use *#performstem* for any photographs they took.

The consortium generated **a total of eight short videos,** seven of them about the project activities. Two of these videos were uploaded at the PERFORM YouTube channel within the reported period and the other five will be in February 2017 (Month 16):

- **UOC** and **UAB** generated an introductory video of the project during the kick-off meeting: https://www.youtube.com/watch?v=TsSDpbcR3-w.
- **UOC** and **UAB** also produced a video on the pilot PERSEIAs in Spain, which included: students' feedback: https://youtu.be/g1II6x9uTsc.
- **TRACES** generated four videos on the PERSEIAs based on clown in France: https://youtu.be/T9QJnlVbzcI, https://youtu.be/-3ERyZ2-R6A, https://youtu.be/G-enLa6cYYM,https://youtu.be/R9a8oWA6vFc.
- **UOC** edited a video on the science busking PERSEIAs in UK with the footage produced by **SMS**: https://youtu.be/jHwmufejufs.

Another video was produced about the overall project and management:

- **UOC** elaborated a video in which the PI of the project explained, in Spanish, what difficulties were encountered during the development of the Data Management Plan, and what kind of support the library service at **UOC** provided. The video was presented in September 2016 (Month 11) during the XV Rebuin Workshop on Data and Libraries: https://www.youtube.com/watch?v=VtWqHB5UuNc.

As set in the communication plan, both quantitative and qualitative impact of the use of online and offline tools was periodically assessed (see section 1.3 Impact). The first relevant communication impact started to be visible by September 2016 (Month 11) looking at quantitative data referred to online and offline tools. As for January 31st 2017 PERFORM had 229 Twitter followers and 324 likes on Facebook. As for the website 1,168 sessions were open by 697 visitors (both new and returning visitors) and it had 3,672 visualization of pages (the number includes both the repeated visualization for the same page and visualisation of different pages; for geographic distribution of visitors see Figure 9).

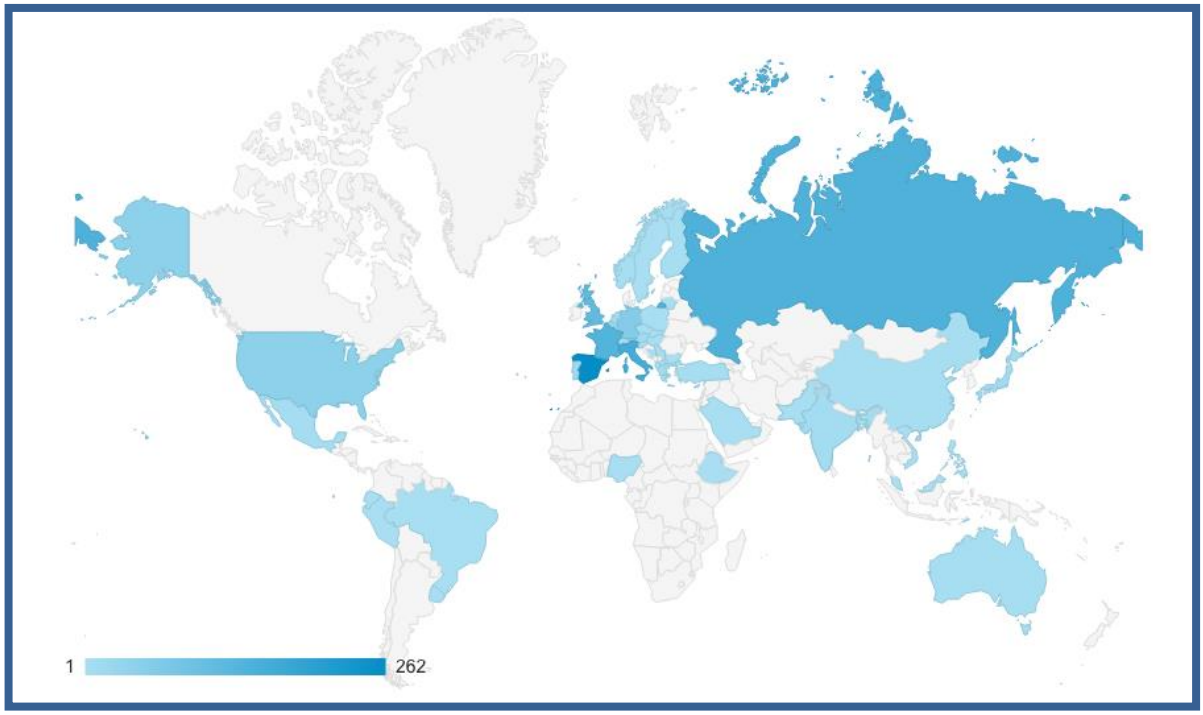


*Figure 9*. Geographical distribution of PERFORM website visualisation (January 2017).

While implementing the project communication plan, its effectiveness was constantly reviewed by **EUSEA**. Among the results of this review the decision to develop communication guidelines to enhance the use of social media and broaden the project's dissemination impact was taken in late 2016 by **EUSEA** and **UOC** to help the consortium using the different designed tools. These guidelines will be presented by **EUSEA** and discussed among partners in April 2017 (Month 18) during the intermediate project meeting in Bristol.

PERFORM produced **two flyers**. In August 2016 (Month 10) **EUSEA** jointly with **UOC** developed and edited the PERFORM brochure, which briefly explained the main highlights of the project as dissemination material. It contained a description of the project, the role of the actors involved, the partners, the WPs, the toolkits to be created, and contact information. The brochure is available for download on the PERFORM website (http://www.perform-research.eu/about/project-description/). In France, **TRACES** created a leaflet to advertise the PERSEIAs delivered for the Nuit Européenne de Chercheurs in September 2016 (Month 11) (see Figure 10).

During December 2016 (Month 14) the first **external newsletter** structure was discussed between **UOC** and **EUSEA**. In January 2017 (Month 15) **EUSEA** invited selected partners to write the contributions for the first PERFORM external Newsletter. The result was the following set of articles:

- *Performing innovation in science learning* - by **UOC**
- *Europe and beyond - The global dimension of Perform* - by **UNESCO**
- *PERSEIAS - The ultimate science shows* - by **TBVT**
- *Responsible science communicator* - by **UoW**
- *Responsible Research and Innovation and education processes* - by **UAB**
- *Engaging students with science using performing arts* - by **UoB**
- *Training reflexive researchers* - by **AJA**

The newsletter aims at the different target audiences described in the project's communication strategy. A dissemination of the newsletter will start in March 2017 (Month 17) through a mailing list. The newsletter will be sent to all consortium members, who will invite their personal and institutional contacts to subscribe to it.

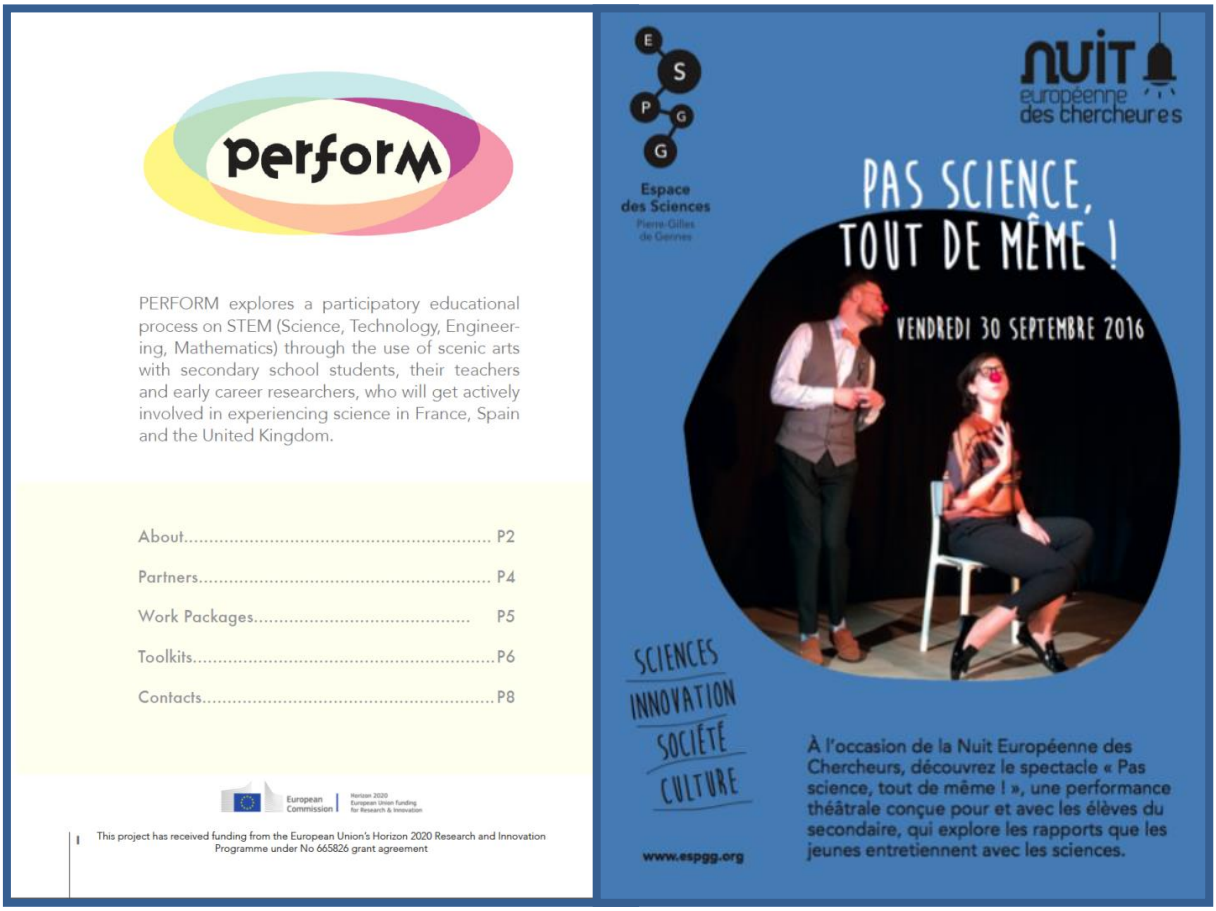


*Figure 10.* Screenshots of the PERFORM brochure cover page with table of contents (left) and the leaflet for Nuit Européenne de Chercheurs (right).

*Task 6.2 Building the community relations and outreach*

**UOC**, **UAB**, **UoB**, **TBVT**, **TRACES**, **SMS**, **EUSEA** and **UNESCO** contributed to this task **by organising one conference** (**UNESCO**) and actively participating in **11 conferences, 3 workshops, and 8 other events, including one pitch event,** in order to present the project and disseminate the PERFORM project initial results.

On the one hand, **UAB**, **UOC, SMS, TRACES** and **EUSEA** participated in **13 events organised by national contact points, FP7 or other H2020 projects** or in which they were present:

- RRI-tools Workshop in Milan, November 10th 2015 (Month 1):

  **EUSEA** took part in this workshop organized by the National Science Museum in Milan and presented the PERFORM project.

- SWAFS InfoDay organised by the Spanish national contact point in Madrid (Spain), February 16th 2016 (Month 4):

  Invited speech by **UOC** to present *The case of success of the PERFORM project*.

- Welsh Government event in Cardiff to promote H2020, March 17th 2016 (Month 5):

  **SMS** shared social media communications about the PERFORM project.

- 1st HEIRRI project Conference: "Teaching Responsible Research and Innovation", Barcelona (Spain), March 18th 2016 (Month 5):

  Attended by **UAB** and **UOC**, contributing with an oral presentation on *Performing RRI in science education: how to measure the impact?* that was published in the conference proceedings in open access (see Task 4.1). The conference was also used to make networks with both national and international research projects related to RRI, education and assessment.

- RRI-Tools workshop in Barcelona (Spain), March 31st 2016 (Month 5):

  Participation of **UOC** and **UAB** in a discussion session with other H2020 projects on how to embed RRI in research and innovation projects.

- TEMI Final Congress 2016: 'Teaching the TEMI Way' Congress, Leiden (Netherlands), April 15th-16th 2016 (Month 6):

  Attended by **TRACES** contributing with an oral communication on *Worst scenarios: an enquiry into science education projects nightmares - "It could be worse. It could be raining."*

- EUSEA annual conference Tartu (Estonia), May 18th-19th 2016 (Month 7):

  A PERFORM session was planned with **UOC** contributing with an oral presentation on *The PERFORM project*. The goal of this event was to reach one of the target audiences defined in the communication plan: namely science communicators' community that took part into the conference from all over Europe.

- SWAFS InfoDay organised by the Spanish national contact point in Barcelona (Spain), May 19th 2016 (Month 7):

  **UAB** invited speaker presented an oral communication entitled *'Successful cases within the SWAFS Programme: The case of PERFORM'*.

- CREATIONS project Summer School in Attica (Greece), July 3rd-8th 2016 (Month 9):

  **TBVT** delivered a workshop on *Exploring teenagers' perception about RRI values – The use of participatory workshops in PERFORM project*. The CREATIONS Summer

School meeting was an opportunity to reach the teachers' community by presenting the innovative approach of PERFORM.

- RRI-Tools symposium "RRI in the UK: the post-BREXIT future" in London (UK) in September 23rd 2016 (Month 10):

  Participation of **UoB** in this workshop organised by the University College London about the understanding and integration of RRI in the UK academic context

- NUCLEUS project annual conference Lyon (France), October 12th -14th 2016 (Month 12):

  **EUSEA** took part at the workshops organized during the conference networking and sharing reflections on RRI challenges with colleagues from other European projects in order to reach out policy makers, and to build bridges with other European projects focusing on RRI.

- RRI-Tools Final Conference in Brussels (Belgium) in November 21st-22nd 2016 (Month 13):

  Poster presentation by **UOC** and **UAB.**

- SWAFS National Contact Points Network Sis.Net 'Opening science to society' reception, Brussels (Belgium), November 15th 2016 (Month 13):

  **EUSEA** represented the PERFORM in an FP7 and H2020 projects **pitch session**.

On the other hand, **TBVT**, **TRACES, SMS, UoB, EUSEA** and **UNESCO** participated in **four international conferences and events on science education and communication research and practice**:

- PSCT (Public Communication in Science and Technology Network) Conference, Istanbul (Turkey), April 26th-29th 2016 (Month 6):

  Attended by **TBVT** and **TRACES** contributing with oral communications *Big Van-scientists on the road. Participatory science education approaches based on performing arts* (**TBVT**) and *Spectacular science: a reflection about limits and opportunities* (**TRACES**).

- ECSITE annual conference, Porto (Portugal), June 15th-17th 2016 (Month 8):

  Attended by **SMS** presenting the PERFORM project in the context of speaking about breaking down barriers through science shows.

- At the Nuit Europeénne des Chercheur.e.s in Paris (France), September 29th 2016 (Month 11):

  **TRACES** presented the PERFORM project through a theatre performance with the title *Pas science, tout de même!*

- Association for Science Communication (ASE) conference, Reading (UK), January 6th 2017 (Month 15):

  **SMS** and **UoB** presented the PERFORM project through an oral communication on *Participatory engagement with scientific and technological research through performance.*

Furthermore, two proposal sessions were submitted to international conferences on science communication: i) 2017 EUSEA Annual conference (Leuven, May) and ii) 2017 ECSITE conference (Porto, June), and were accepted in January 2017 (Month 15).

Also, **UNESCO,** with the support of **UOC, organised a conference** and participated in **five international events and conferences to ensure PERFORM's policy impact** (see Task 5.2). During these conferences and events a constant activity on Twitter and Facebook was implemented to relate the PERFORM project with other similar actions at the European level.

**Three press releases** of PERFORM were produced in this period. Two press releases were launched by **UAB** and **UOC** at the Spanish level in November and December 2015 (Months 1 and 2) and another by **UNESCO** on the WSDPD published at RRI-Tools blog in November 2016 (Month 13).

Also the project was communicated through **media** at regional level. In May 2016 (Month 7) PERFORM PI (**UOC**) was interviewed by the Catalan newspaper *Ara* in an article called '*Science is attractive*'. The PI was later interviewed for the UOC internal news bulletin in September 2016 (Month 11).

Finally, as explained in Task 1.4, **UOC** published the PERFORM project in the **Scientix** network webpage in September 2016 (Month 11).

### 1.2.7 Work Package 7 (WP7): Ethics requirements

**UOC** led the coordination of WP7 on Ethics not originally included in Annex I of the GA, but added in December 2015 (Month 2). Three additional deliverables concerning ethical issues were achieved within the reported period. As WP7 was added in Month 2, it was not possible to timely submit two deliverables in the expected date of Month 1.

- **Deliverable 7.1 POPD Requirement 2**, submitted in April 2016 (Month 6), which met Ethics requirement No. 2 of Table 1.4 in the GA Annex 1 corresponding to providing detailed information on the procedures that are being implemented for data collection, storage, protection, retention and destruction within PERFORM. It also confirmed that these processes comply with national and EU legislation. The content of this deliverable was complemented by the PERFORM Data management plan (Deliverable 1.4).
- **Deliverable 7.2 H Requirement 9**, submitted in February 2016 (Month 4), which met Ethics requirement No. 9 of Table 1.4 in the GA Annex 1 corresponding to providing details on the procedures and criteria that will be used to identify and recruit research participants before the commencement of the relevant part of the research in February 2016 (Month 4). A detailed explanation on the procedures and criteria to select participant schools, students, teachers and early career researchers was provided. **UAB** contributed to this deliverable as the institution that centralised data collection and storage during the lifetime of the research project, as responsible for impact assessment (WP4 leader).
- **Deliverable 7.3 POPD Requirement 4**, submitted in January 2016 (Month 3), which met Ethics requirement No. 4 of Table 1.4 in the GA Annex 1 corresponding to submission of the copies of opinion or confirmation by the competent Institutional Data Protection Officer and/or authorization, or notification by the National Data Protection Authority (whichever applies according to the Data Protection Directive and the national law) before the commencement of the relevant part of the research in February 2016 (Month 4). It contained the confirmation by the Catalan Data Protection Agency, which is the correspondent competent authority of both the institution coordinating the research project (**UOC**) and the institution that centralizes data collection and storage during the lifetime of PERFORM (**UAB**).

## 1.3 Impact

The expected impacts related to the work of the different WPs envisioned in Section 2.1 of the DoA are still relevant and need no update at this stage of the project. As expected, the different activities carried out by the different WPs so far contributed to the update of innovative methods in science education based on performing arts, and to the establishment of a dialogue with relevant European stakeholders in the fields of education and research.

The PERFORM project was included in the **Scientix** network webpage in September 2016 (Month 11).

In this first period the consortium reached around **3,000 students** through the implementation of exploratory workshops (467 students) and resultant PERSEIAs in Task 2.1 (2,407 students: 318 from 7 secondary-schools in France, 266 from 12 schools in the UK, and 1,906 from 16 Spanish schools) and the development of the initial PWs in Task 2.2 (102 students). **Twelve teachers** were also involved in these PWs.

The consortium also reached **56 early career researchers** through the first round of trainings implemented in Barcelona, Paris and Bristol as part of Task 3.2.

PERFORM **website and four social media tools** were launched in April 2016 (Month 6) and by January 2017 (Month 15) the **website had 679 visitors**, while **Twitter had 229 followers** (Figure 11) and **324 likes on Facebook** (Figure 12).

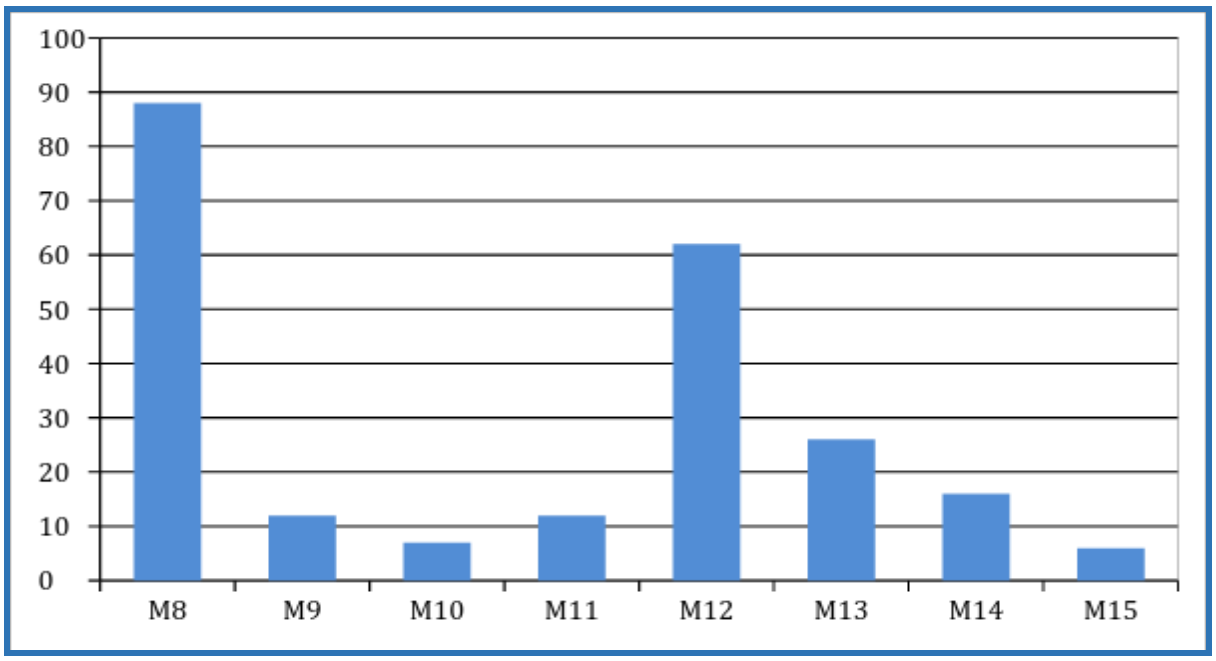


*Figure 11.* General trend of PERFORM Twitter followers.

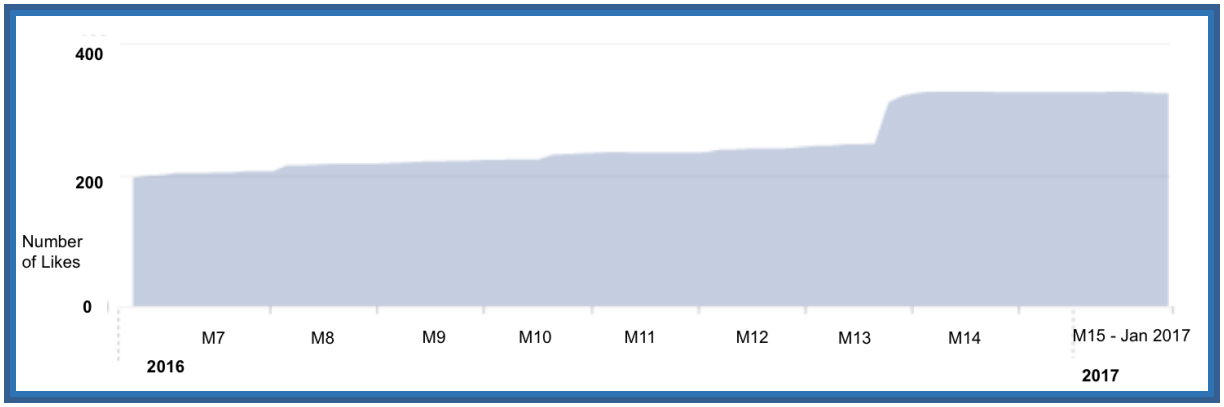


*Figure 12.* General trend of *like* number on the PERFORM Facebook page.

Partners participated in a total of **23 national and international dissemination activities, one of them organised by UNESCO as for the World Science Day for Peace and Development 2016 in Paris**. More specifically, the consortium participated in 19 international conferences and workshops trough oral communications, posters, and performances demonstrations (**EUSEA**, **SMS**, **UOC**, **TBVT**, **UNESCO**), and 4 national events (**UAB**, **SMS**, **TRACES** and **UoB**), elaborated 8 short videos (**UAB, TRACES**, **SMS**, and **UOC**), two flyers (**EUSEA** and TRACES), three press releases (**UAB, UNESCO, UOC**), and appeared in a regional newspaper and in the UOC internal news bulletin (**UOC**).

The consortium also published the PERFORM work presented at the 1st HEIRRI Conference 2016 in the **conference proceedings** in open access (**UAB** and **UOC**), and submitted two research articles to international peer-reviewed journals that are now under review (**UAB** and **UOC**).

For the next reporting period further needs were identified to support partners in enhancing their contributing to the expected impact, such as:

- Definition of guidelines for partners to be used to post and publish on Facebook and Twitter that will be delivered in April 2017 (Month 18).
- Collection of information, stories and facts coming from the first phase of the project to provide stakeholders with interesting aspects anticipating the final results of the project that will be included in the next external e-newsletter in October 2017 (Month 24).

# 2. Update of the plan for exploitation and dissemination of result (if applicable)

**EUSEA** elaborated **Deliverable 6.1 Plan for communication, dissemination and exploitation** in February 2016 (Month 4), which updated the plan for exploitation and dissemination of results described in the DoA as follows:

- Identification of 6 target groups (i.e. teachers, professional science communicators in the field of events and museums, researchers, students and performers) and the corresponding key messages.
- Identification of partner networks relevant for PERFORM dissemination purposes, such as museums and science events networks at European and international levels, and researchers' networks involved in events such the European Researchers' Night.
- Detailed description of offline tools, such as a brochure, events' press releases, interviews on specialized newspapers and publications in research reviews to be published during the project.
- Detailed description of online tools, such as the website (multi-lingual), a Facebook, Twitter and Instagram profile, and a YouTube channel.
- Organisation of management tasks among consortium members to effectively implement the communication plan. The strategy developed to disseminate the progress and outcomes of the project was designed in order to give all project partners the possibility to publish news and information relevant to the project in the social media. One person per project partner was nominated administrator of the Facebook page and Twitter and Instagram accounts. This strategy aims at describing lively and in real time the project actions in which different partners are involved. **EUSEA** coordinates these actions and has the role of inviting and reminding the different partners to contribute through the different channels on a periodic base. Moreover the **EUSEA** team involved in the PERFORM communication management, supported by **UOC**, is collecting information, news and material to update the website on a monthly base.

- During November and December 2016 (Months 13 and 14) a decision to enhance the efforts to disseminate the results of the project through video messages was taken and it will be implemented from February 2017 (Month 16) on. These video messages aim both at describing the results of the project and to explain the key methods used to develop participatory shows.

# 3. Update of the data management plan (if applicable)

**UOC** elaborated **Deliverable 1.4 Data management plan** in April 2016 (Month 6), as a first version of the PERFORM project data management plan including the description of the management life cycle for all research data generated by the project.

This data management plan provided an overview of how the research data is being organized, and how it will be handled during the duration of PERFORM and after the project is completed. More specifically, it described what data will be collected and processed (following specific methodology), whether and how these data will be shared and/or made open, and how they will be curated and preserved according to the corresponding ethical requirements. The data management plan is a living document since internal or external factors may cause changes in data management during the development of the project. Thus the data management plan is expected to evolve with the project and will be updated accordingly in October 2017 (Month 24), if needed.

# 4. Follow-up of recommendations and comments from previous review(s) (if applicable)

Not applicable, this is the first report to the EC.

# 5. Deviations from Annex 1 and Annex 2 (if applicable)

## 5.1 Tasks

In this first reporting period there were five minor deviations from the DoA related to Tasks 2.1, 3.1, and 4.2, without any consequence in the full achievement of the tasks, WPs and critical objectives.

First, within Task 2.1 it was decided to use exploratory workshops as a research method instead of the focus groups initially planned in the DoA due to the impossibility of splitting a classroom of 25-30 secondary school students into groups of 8-10 students in any of the four selected schools in each case study, which is a condition for conducting focus groups. In contrast, a workshop format, although presenting limits in terms of engaging students in debate, allowed for the exploration of the topics **TBVT** needed for elaborating the protocol that will be part of Deliverable 2.1 in February 2017 (Month 16).

Second, and also within Task 2.1, **TBVT** and **TRACES** implemented exploratory workshops in three and one schools from low and medium socio-economic backgrounds in Spain and France, respectively. As it was initially envisioned in the DoA, two schools from each medium and low socio-economic backgrounds had to be recruited for these workshops for comparison purposes. In the Spanish case, this deviation was due to a misguided interpretation in the assignment of the

socio-economic level of one of the participant schools located in the city of Hospitalet de Llobregat (Barcelona), which Gross Disposable Household Income (GDHI) per capita corresponded to a medium socio-economic classification. When **TBVT** visited the school, they become aware that this previous classification did not correspond to the reality of the school nor of the neighbourhood. Due to the commitment already established with the school it was not possible to change it. In the French case, **TRACES** selected two schools of each socio-economic level but in late March 2016 (Month 7) one of the two medium level schools left the project. Since **TRACES** had to find a new school in a very short time in order to begin the exploratory workshops before the end of the school year in June 2016, **TRACES** contacted and invited a school that already told them they were ready to participate, even being a low socio-economic level school. This deviation did not affect the results and objectives of Task 2.1 because the consortium was able to gather data from at least one school from medium socio-economic background in each setting, thus covering potential differences in students' perceptions and attitudes towards science in each socio-economic background. A new school from middle socio-economic level in each case study was selected in September 2016 (Month 10) to participate in Task 2.2.

Third, related to Task 3.1, instead of having the teachers in the UK in the knowledge sharing workshop (April 2016) together with the consortium as initially planned in the DoA **UoB** had to organise separate meetings with them since an intensive five-day meeting such as this one did not allow it for teachers to participate. **UoB** took advantage of this situation by organising non-previously planned meetings with teachers and researchers from France and Spain to ask them for feedback, with the support of **TRACES**, **TBVT**, **SMS** and **UAB**. In doing this, this deviation did not affect the achievement of the task, since relevant skills and knowledge for the further design of PERSEIAs was gathered from teachers.

Fourth, and also related to Task 3.1, the consortium requested for a two-month extension of Milestone 1 "Selection of the specific training skills to be developed" led by **UoB** from Month 5 to Month 7, which was approved by the EC PO on March 8th 2106. The reasons for the need of this extension were that in order for **UoB** to be able to do the selection of the training skills they needed to have the knowledge sharing workshop before, and it was scheduled at the beginning of April 2016 (Month 6), just after the deadline for the milestone, making it not possible to produce an informed milestone without the workshop happening. This change did not affect the objectives nor the impact of the task.

Last, related to Task 4.2, **SMS** and **UoB** expressed concerns regarding the use of social media and online systems to interact with students in and outside schools because of legal and ethical aspects in the UK: i) social media sites such as Twitter have an age limit of 14 and the students are 13-14 years old, therefore are not all old enough to legally be on social media sites; ii) schools are often trying to teach safeguarding online to their students; iii) by encouraging the use of social media, especially to interact with people they do not know, the consortium could risk going against the school policies; and iv) there are many ethical issues surrounding online interaction with minors. During the PERFORM consortium meeting in Paris in November 2016 (Month 13) it was agreed by **UoW, SMS** and **UoB** that the contingency plan written in the DoA would be followed. Such plan considers **UoW** interviewing UK students instead of using social media-based methods. **UoW** re-oriented the research design work for the UK context and prepared a detailed implementation strategy based on the contingency plan included in the DoA as well as in the Risk management plan (Deliverable 1.3) without any implication for the achievement of Task 4.2 objective.

## 5.2 Use of resources

The consortium in general used less effort and resources than those planned in GA Annex 1 for this reporting period (Months 1 to 15).

Economic resources expenditure was consistent with the effort resources spent. Despite the estimated expenditure was not linear, it will be during the second half of the project when activities will be bigger and more expensive. From February 2017 (Month 16) until the end of the project research conducted at schools for the development of students' PERSEIAs and their assessment (Tasks 2.2, 2.3, 4.2, 4.3, 4.4), training activities with teachers and early career researchers (Tasks 3.2, 3.3), and actions for policy impact, dissemination, communication, and exploitation (Tasks 5.2, 6.2) will require more high-intensive effort than those conducted during this first reporting period. For this reason, usually spending *Other Direct costs* did not rate too high.

***Economic resources:***

During this first period economic resources were, in general, spent according to the DoA. Expenses per partner are detailed in Table 9 and Figure 13.

*Table 9.* Expenses per partner. Executed budget from Month 1 to Month 15 versus % of total budget.

| **Partner** | **Executed (% of total budget)** | | | | |
|---|---|---|---|---|---|
| | **Personnel costs** | **Subcontracting** | **Other direct costs** | **Overheads** | **Total** |
| **UOC** | 52,036.24€ (38.25%) | - | 3,718.58€ (15.37%) | 13,938.71€ (34.80%) | 69,693.53€ (34.80%) |
| **TBVT** | 43,260€ (22.89%) | 2,841€ (28.41%) | 4,890.90€ (12.08%) | 12,037.73€ (20.98%) | 63,029.63€ (21.23%) |
| **UoB** | 50,178.98€ (26.07%) | - | 12,817.13€ (27.96%) | 15,749.03€ (26.43%) | 78,745.14€ (26.43%) |
| **SMS** | 24,971.70€ (34.59%) | - | 7,103.84€ (72.49%) | 8,018.89€ (39.12%) | 40,094.43€ (39.12%) |
| **UoW** | 49,650.67€ (32.46%) | 0€ (0.0%) | 4,696.29€ (16.44%) | 13,586.74€ (29.94%) | 67,933.70€ (26.97%) |
| **AJA** | 10,270.32€ (25.23%) | - | 2,820.27€ (76.22%) | 3,272.65€ (29.48%) | 16,363.24€ (29.48%) |
| **TRACES** | 65,524.76€ (68.25%) | - | 7,565.24€ (93.40%) | 18,272.50€ (70.21%) | 91,362.50€ (70.21%) |
| **UNESCO** | 42,938.57€ (39.04%) | - | 35,609.08€ (31.24%) | 19,636.91€ (35.07%) | 98,184.56€ (35.07%) |
| **EUSEA** | 18,105€ (14.37%) | - | 6,418.02€ (35.66%) | 6,130.76€ (17.03%) | 30,653.78€ (17.03%) |
| **UAB** | 55,614.03€ (44.97%) | - | 5,744.71€ (15.09%) | 15,339.69€ (37.93%) | 76,698.43€ (37.93%) |
| ***Total*** | **412,550.27€ (49.92%)** | **2,841.00€ (8.84%)** | **91,384.06€ (38.17%)** | **125,983.58€ (47.28%)** | **632,758.91€ (31.68%)** |

**SMS**, **AJA** and **TRACES** spent more than the other partners (in percentage) due to the fact that they already started to develop their activities at schools planned for the second reporting period (Task 2.2). Their budget was tight to the activities to be performed.

Whilst **UoB** expenditure appeared low in this period, due to the weighting of activity. The toolkits produced by WP3 (to be delivered in Months 33 and 36) partly rely on the activity towards and outputs of Deliverable 2.2 in WP2 (to be delivered in Month 30), meaning

expenditure and effort will increase in the latter part of the project. Furthermore, **UoB** budgeted for time to reflect on the work completed in the first year and work with partners to evolve the approach for the following year.

By contrast, **EUSEA** spent 17% of their total budget because its main tasks were related to the development of the communication strategy and the main action to start the dissemination of the main features of the project (Task 6.1). The optimisation of the staff efforts were also determined by the cooperative approach used for dissemination. Starting from February 2017 (Month 16) **EUSEA** staff efforts will constantly increase as the project progresses and the need to present and disseminate its results becomes increasingly relevant (Task 6.2).

In the particular case of *Other Direct costs* **UNESCO** spent more than the 15% of *Personnel Costs* for *Other Direct costs*. This was due to **UNESCO**'s role (as it is described on the DoA) in PERFORM is to promote the sustainability of the project (Task 5.1) and embed policy linkages between PERFORM and EU science education policy and decision makers, from the early stages of the project. In addition, **UNESCO** is also in charge of ensuring the long-term impact and relevance of the PERFORM findings, methodologies and outcomes. In this framework, **UNESCO** as one of PERFORM partners, organized at its Headquarters a conference to present and promote the PERFORM project to the UNESCO's Permanent Delegations and the general public at the occasion of the WSDPD (see Task 5.2), which represented an important expenditure.

Also, **UoB** spent (a bit) more than the 15% of *Personnel Costs* for *Other Direct costs*, due to travel costs and other costs related to dissemination activities and workshops organization. All expenses were foreseen on the DoA.

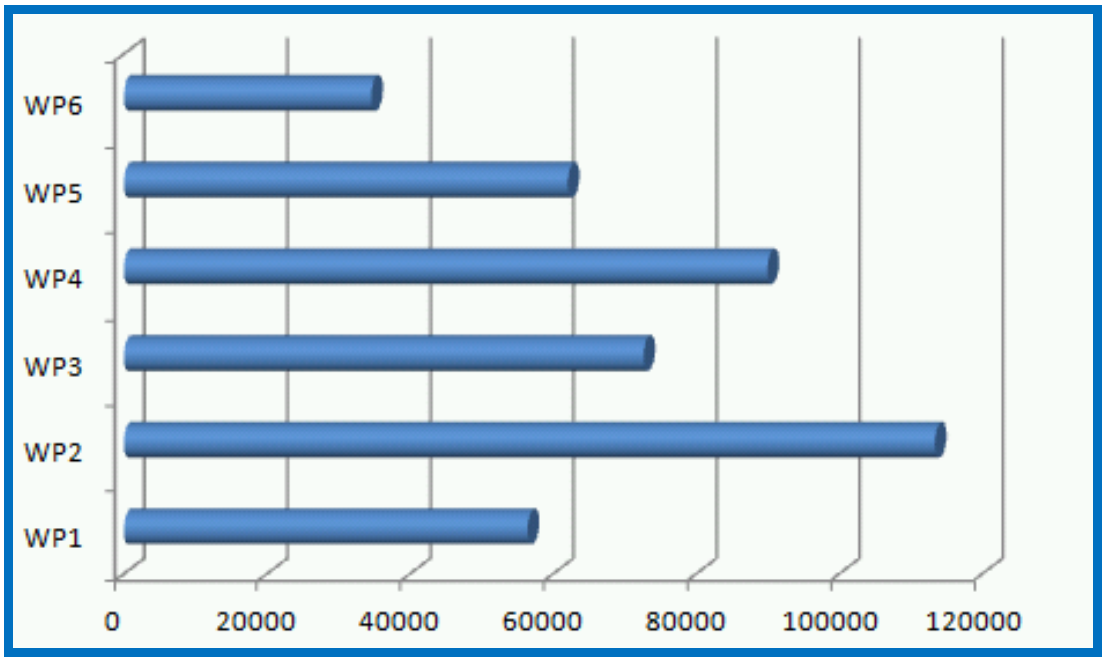


*Figure 13.* Personnel and Direct costs (€) spent per WP (Month 1 to Month 15)

***Effort resources:***

The effort in person months was distributed according to the partners' expertise and capabilities for the whole duration of the project. Table 10 shows the effort distribution per partner during the first reporting period versus the effort distribution for the whole project. Figure 14 shows person months spent per partner and WP in this period, respectively.

Generally, the cumulative effort was slightly lower than the foreseen for some partners. This was due to the same reason explained above. In general, the majority of the project activities will be larger (and will need more person months) in the second half of the project.

*Table 10.* Executed effort from M1 to M15 versus planned effort for the whole project.

| **Partner** | **Executed (Planned whole project)** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **WP1** | **WP2** | **WP3** | **WP4** | **WP5** | **WP6** | ***Total*** |
| **UOC** | 6.12 (12) | 1.08 (2) | 0.7 (2) | 6.27 (22) | 0.54 (2) | 0.6 (2) | 15.31 (42) |
| **TBVT** | 0.5 (1) | 10.2 (42) | 0.71 (4) | 0.69 (3) | 0.1 (2) | 0.16 (2) | 12.36 (54) |
| **UoB** | 0.2 (1) | 0.37 (7) | 8.76 (31) | 0 (0) | 0 (2) | 0 (2) | 9.33 (43) |
| **SMS** | 0.88 (1) | 10.27 (30) | 0.94 (2) | 0.3 (2) | 0.08 (1) | 0.68 (2) | 13.15 (38) |
| **UoW** | 0.55 (1) | 0.88 (2) | 1.19 (6) | 3.3 (14) | 0 (1) | 0.77 (2) | 6.69 (26) |
| **AJA** | 0.55 (1) | 0.17 (1) | 1.9 (6) | 0 (1) | 0 (0) | 0.05 (1) | 2.67 (10) |
| **TRACES** | 0.47 (1) | 14 (18) | 0.04 (0) | 0.39 (1) | 0 (2) | 0 (1) | 14.9 (24) |
| **UNESCO** | 0.4 (1) | 0 (0) | 0 (0) | 0 (0) | 12 (15) | 0.09 (6) | 12.49 (22) |
| **EUSEA** | 0.3 (1) | 0 (0) | 0 (0) | 0 (0) | 0 (2) | 2.72 (18) | 3.02 (21) |
| **UAB** | 3.15 (4) | 0.3 (2) | 0.76 (1) | 14.84 (33) | 0.1 (1) | 0.3 (2) | 19.45 (43) |
| ***Total*** | **13.12 (24)** | **37.27 (104)** | **15 (53)** | **25.79 (76)** | **12.82 (28)** | **5.37 (38)** | **109.37 (323)** |

**AJA** spent less than expected in terms of effort resources, particularly on WP3. This is due to several reasons related to the early career researchers' training: i) the training was designed according to the expertise already available at **AJA** as timing constraints with French Graduate Schools did not allow to position the training so as to build up from participatory workshops design that were not designed at that time, thus reducing working hours originally planned to tune the training to its specific setting, ii) obtaining the agreement from Graduate Schools in Paris for the participation of early career researchers was less demanding than expected, as a free of charge training was very attractive, and iii) only one trainer from AJA was involved instead of the two originally planned due to lower than expected attendance of early career researchers. Also, regarding teachers' training the anticipated work to be done will actually start in March 2017 (Month 17).

**TBVT** effort resources will increase starting in February 2017 (Month 16), as more people will need to be involved in the project for coordinating Tasks 2.2 and 2.3, to implement activities in Spanish schools, and for the revision of the delivered activities in Spain, France and UK. In the same line, starting in Month 16 **TBVT** will be involved in the teachers' and early career researchers' trainings (Task 3.2 and 3.3), as well as in actions for results' dissemination and exploitation (Task 6.2) which will be much intense as PERFORM increasingly generates results.

In addition, there was a minor deviation in the **SMS** resources planned for Task 2.2 partly affecting this period. **SMS** initially planned to work with two schools in Manchester to conduct Task 2.2 activities because one of their educators is based in there, but **UoB** argued that it was impractical for early career researchers from Bristol to visit the schools in Manchester, and it was not possible for **UoB** to train researchers in Manchester. Furthermore, in terms of research it was difficult to consider two separated regions such as Bristol and Manchester as a single case study. After several discussions between **UoB** and **SMS** and after looking into different options it was clear that it would not be possible to work with schools in the area of Manchester. The format of the Task 2.2 participatory workshops (i.e. having two groups of students in parallel)

required **SMS** to send two members of staff each time when the original budget was just for one person. **SMS**'s lead performer was based in Bolton and **SMS**'s second performer was in Milton Keynes, so both staff had to travel each time there is a school workshop. To solve the situation, **TBVT**, as WP leader, agreed to cover related travel costs of approximately 1,700€ for visits to the new Bristol schools during workshops activities, from January 2017 to March 2017.

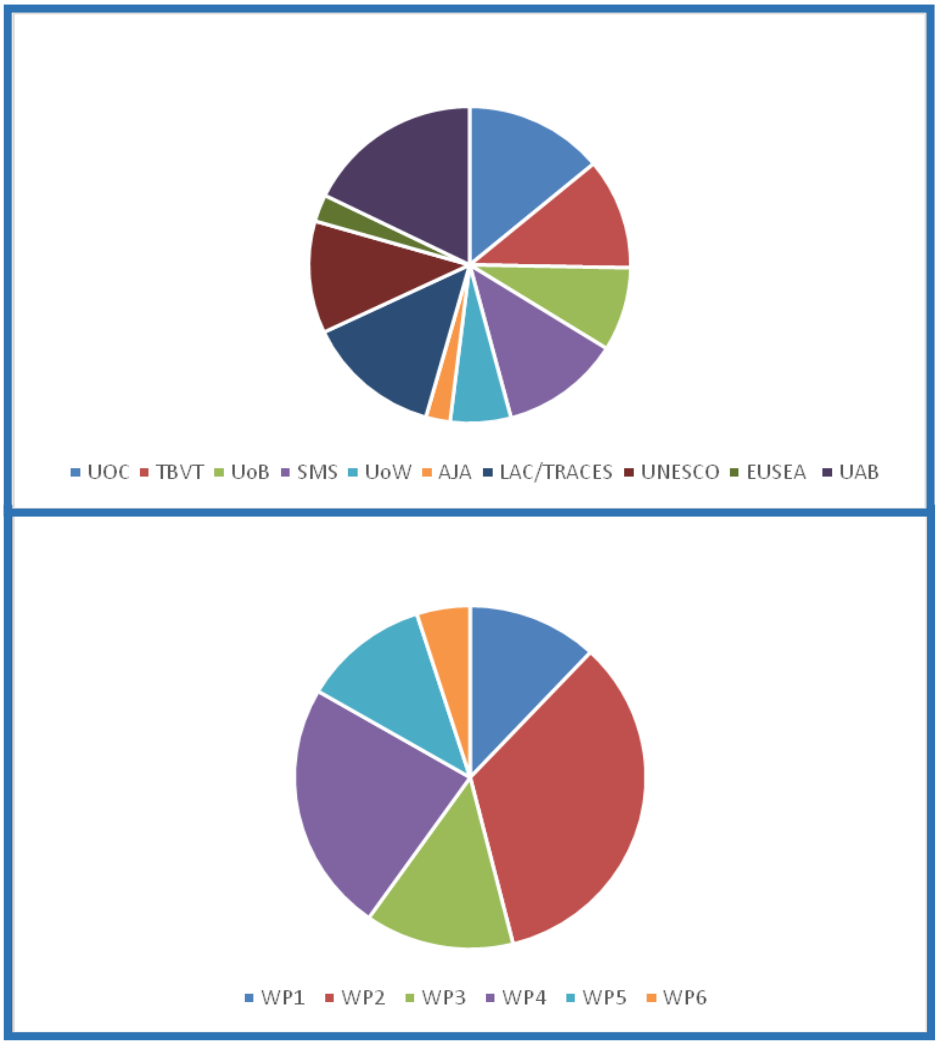


*Figure 14.* Person months per partner (top) and person months per WP (bottom) from Month 1 to Month 15.

### 5.2.1 Unforeseen subcontracting (if applicable)

Not applicable in this reporting period.

### 5.2.2 Unforeseen use of in kind contribution from third party against payment or free of charges (if applicable)

Not applicable.