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 01/02/2017 to 30/04/2018

Periodic report: [4th internal]

Contents

List of acronyms

AB:	Advisory Board
AJA:	L'Atelier des Jours À venir
CSC:	Case Study Coordinators
CT:	Coordination Team
DoA:	Document of Action
EC:	European Commission
ECR:	Early Career Researchers
EUSEA:	European Science Events Association
GA:	Grant Agreement
GenA:	General Assembly
ICT:	Information and Communication Technology
LAC:	Les Atomes Crochus
MoE:	Ministries of Education
PERSEIAs:	Performance-based Science Education and Innovation Activities
PEST:	Performers ECR Science communicator and Teacher
PO:	Project Officer
PW:	Participatory Workshops
RRI:	Responsible Research and Innovation
SC:	Steering Committee
SMS:	Science Made Simple
STEM:	Science, Technology, Engineering, Mathematics
STEAM:	Science, Technology, Engineering, Arts, 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

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

During the reported period (Month 16 to Month 30), the PERFORM consortium kept generating results towards the **PERFORM overall objective** of investigating how the establishment of a direct interaction between students and researchers by using performing arts methods for science education has an impact on students' motivation and interest towards science, technology, engineering, and mathematics (STEM). The positive progress of the project in this direction was confirmed by the highly positive mid-term assessment produced by the Advisory Board (AB) and effective and on-time deliberation of expected outcomes.

The PERFORM project completed the **two phases of a participatory educational process with secondary school students, teachers and early career researchers (ECR)** that guided students to generate scientific monologues, busks and theatrical pieces. This process consisted of a series of workshops that were evaluated according to **a set of indicators assessing the inclusion of the values of the Responsible and Research and Innovation (RRI) approach**, as well as potential changes in students' attitudes, knowledge and perceptions towards science, and the acquisition of the transversal competences needed to pursue STEM careers, with a special emphasis on gender issues. Students and researchers also had the opportunity to interact beyond face-to-face encounters by using social media tools, which led to the development of an Information and Communication Technology (ICT) automated tool to enable social media data analysis. Also, the PERFORM consortium developed training toolkits addressed to **ECR** that have been informed by pilot trainings conducted in UK, France and Spain. Similarly, pilot trainings addressed to secondary school teachers in Spain, UK and French are informing the development of **training toolkits to equip teachers** with the tools to improve their skills on science communication, performance and reflexivity.

Exploitable results in this period included the development of two protocols: i) a protocol 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 Responsible Research and Innovation (RRI) values; and ii) a **protocol of tested performance-based science education methods generating a transformative participatory educational process** amongst secondary school students. Our consortium generated another result related to the impact assessment consisting of a battery of **indicators to assess RRI values in science education published in open access in an international journal.**

Furthermore, considerable effort was put into management as well as dissemination and communication actions. The consortium ensured 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 international policy events**.

In sum, **three deliverables** and **two milestones** were successfully achieved (Table 1) and **three 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 M16-M30.

WP no.	Del./ Mil.	Deliverable/Milestone name	Lead beneficiary	Peer-reviewed by	Delivery Month
WP1	D1.3	Evaluation Report of the Advisory Board	**UOC**	**UNESCO, LAC**	24

WP2	D2.1	Final protocol of tested methods to transform a performance-based activity into a PERSEIA	**TBVT**	**UoB, UoW, UOC**	16
WP2	D2.2	Final protocol of tested methods to generate a transformative participatory educational process by using science and arts-based education approaches	**TBVT**	**UAB, AJA, UOC**	30
WP4	Mil.4	ICT development of an automated tool to enable social media data analysis	**UoW**	**UOC**	24
WP1	Mil.6	Links to Scientix	**UOC**	--	30

Table 2. Summary of the exploitable results generated in reporting period M16-M30.

WP no.	**Exploitable result**	**Involved beneficiaries**	**Means for current and further exploitation**
WP2	Final protocol of tested methods to generate a PERSEIA	**TBVT**	Publication at PERFORM website and social media (including videos)
WP2	Final protocol of tested methods to generate a transformative participatory educational process by using science and arts-based education approaches	**TBVT**	Publication at PERFORM website and social media (including videos)
WP4	Scientific article: *'Responsible Research and Innovation Indicators for Science Education Assessment: How to Measure the Impact*?' International Journal of Science Education (Q1, IF:1,85).	**UAB, UOC**	Gold open access publication Publication at PERFORM website and social media

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

PERFORM contributed to this objective through the delivery of a **user-friendly toolkit** that summarizes the document 'Final protocol of tested methods to transform a performance-based activity into a PERSEIA' (Deliverable 2.1, Task 2.1). This toolkit named '**From drama-activities to raising scientific aspirations in secondary school students**' includes 11 short videos and links to 7 documents, and it is available on the PERFORM website.

Also in this period, PERFORM implemented **the first and second rounds of participatory workshops (PW) corresponding to Task 2.2** by conducting activities in 12 schools from low and medium socio-economic backgrounds in the three case studies (4 in Spain, 4 in the UK, and 4 in France) (Month 16-ongoing). Participant students were guided by the science communicators/performers involved in the project to generate their own PERSEIAs by means of an interactive participatory process with their teachers and ECRs. Based on the feedback and recommendations received after the implementation of the first round of PWs at 5 participant schools (Month 15-20), the PW were redesigned by adapting them to the local context and needs of the stakeholders involved in each case study and implemented in the remaining 7 schools (Month 27-ongoing). In total, **253 students, 30 teachers and 44 early career researchers** were involved in the PW across the three countries. Schools, teachers and parents of involved students, gave their free and informed consent to participate in the project.

The description of the redesigned PW was included in the toolkit "**Final protocol of tested methods to generate a transformative participatory educational process by using science and arts-based educational approaches**" (Deliverable 2.2, tasks 2.2). As previously done for the Deliverable 2.1, a **user-friendly version of the protocol** is being produced in order to facilitate dissemination. This toolkit will contain short videos and links to the description of the PW conducted in the three case studies, and it will be available on the website of the project and its YouTube channel.

<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

Within this objective **the first pilot ECR training delivered in the three case studies and attended by 66 ECR during the first reporting period was assessed and reviewed**, in order to address both the needs of ECRs and the project in the training in the second stage. **The second phase of ECR trainings then took place in each of the three countries** (Month 24 to 31), having been informed by the first round of activity and designed to address the needs to the ECR. A total of **35 ECR** were voluntarily involved in this second round of trainings across the three countries.

In turn, the **first teacher training took place in Barcelona** (Month 21) and the evaluation undertaken on it informed the teacher training design being further developed in France and the UK. The outcomes of this training were written up in an internal evaluation report and discussed by PERFORM members and led on to inform the **teacher training implemented in Bristol and Paris** (Month 24-25 and 30 respectively). **42 teachers** participated in these trainings. In order to meet the objectives of PERFORM, it was agreed that in accordance with the DoA, training sessions for teachers should endeavour to encourage more two-way, participative communication between teachers and students and amongst students. The subsequent first round of training for teachers in Bristol was designed accordingly and was based on developing and sharing techniques and ideas for reflective dialogues about science. The evaluation was shared with project partners in Paris to influence the design of the teacher training in Paris and a second upcoming round of training in Barcelona to be implemented in Month 33.

In addition, the feedback from the AB was particularly helpful for PERFORM thinking about the toolkit resources for both trainings (i.e., teachers and ECR) that are being produced, and influenced the design and targeting of those resources to ensure that they are highly effective and that they are being correctly implemented by our peers in the researcher development and teacher training sectors, as well as by interested individuals. Advice relating to appropriate content, effective format and dissemination networks for both of the toolkits have also been gathered; in consultation with teachers during the second round of PW and via education networks across Europe as well as experts in RRI in UK, France and Spain.

<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 implementing the designed assessment instruments in secondary schools participating in the PW during the first phase of the participatory process (Months 15-20). The analysis of all these data generated **four internal reports for each case study** by Month 21, each report corresponding to one of the four implementation goals of the PERSEIAs (i.e., transversal competences, RRI values, perceptions and attitudes towards science, creation of the PERSEIA) and including specific recommendations for the redesign of the workshops for the second round.

Based on the insights and reflections generated during the first round of PW, as well as on the feedback received from the AB, the **assessment strategy and tools for the second round of workshops were refined** between Months 23 and 25. The refined assessment tools are being currently implemented in the three case studies, both during and after the second phase of the participatory process in schools (Months 26-ongoing). Results will be analysed within the following months and a policy brief will be produced.

Finally, within this objective PERFORM also started **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. A full empirical research report based on social media and interview data has been fleshed out and is nearing completion.

<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

During the reported period the consortium developed the actions planned in the dissemination and communication plan broadening the spectrum of offline actions implemented at national and international level.

In total, PERFORM participated and/or organised **43 national, European and international conferences, meetings and activities** on STEM education, RRI and/or science communication for dissemination purposes, among which is the Networking Event organized with Scientix in Month 26.

Also, during this period the consortium work on the design of the PERFORM final conference which will be held in June 14-15 2018 (Month 32) in Paris combining promotional online and offline actions to attract different communities of practice to such international meeting.

1.2 Explanation of the work carried per WP

1.2.1 <u>Work Package 1 (WP1):</u> Project coordination and management [Months 1-36]

As WP1 leader, **UOC** coordinated both research and financial activities of the project according to the rules stated in the GA, providing support to other partners when needed. **UOC** also

facilitated communication among consortium members through promoting the use of the intranet and organizing face-to-face and on-line meetings for coordination purposes.

In April 2017 (Month 18) **UOC** organized the external review meeting with the EC Project Officer (PO) and an external reviewer, led the AB evaluation process and coordinated the actions to complete Deliverable 1.3 that was timely submitted.

Finally, links between the consortium and the European network Community for Science Education in Europe (Scientix) were strengthened through organizing and participating in four events within the Scientix network and sharing PERFORM outcomes through Scientix webpage. In doing this, **UOC** achieved two milestones: Mil.3 related to the mid-term internal evaluation and Mil.6 on the links to Scientix.

Task 1.1 Project management

As planned in the DoA, the **PERFORM intermediate meeting** in Bristol (UK) took place in April 10th-12th, 2017 (Month 18), organized by **UOC** and the local partner **UoB**. 20 members of the 10 partnering institutions participated in this 3-day meeting, in which WP leaders updated the consortium on their progress, future tasks were discussed and scheduled in each case study, financial issues were clarified and agreements to improve the use of resources were achieved. The **second General Assembly (GenA) meeting,** attended by all partners, and the **fourth Steering Committee (SC) meeting,** attended by WP leaders, were held the third day of the intermediate meeting.

In the same month, April 24th, 2017 (Month 18), **UOC** coordinated the external review meeting in Barcelona with the attendance of the EC Project Officer and an external reviewer from Odessa National I.I. Mechnikov University (Ukraine). The **UOC** Coordination Team (CT), all WP leaders and science communicators' partners, who presented the progress of WPs during the first 15 months of the project and responded to the questions, also attended the meeting. The **evaluation was highly positive and resulted in a set of comments and recommendations that UOC circulated** encouraging partners and particularly WP leaders to follow them. The day after this meeting, **UOC** and **UAB** organised a visit with the EC Project Officer at two participant schools in the PW in 2017 (INS Santa Eulàlia and IES Castellbisbal), in which the EC Project Officer had the opportunity to meet and talk with participant teachers and students.

Two other SC meetings were organised by **UOC** in this period: the **fifth SC** on November 30th, 2017 (Month 25), and the **sixth SC** on April 19th, 2018 (Month 30), both of them conducted on-line and attended by all WP leaders. The agendas were mainly set up on the basis of (i) the midterm review recommendations by the EC and AB members and (ii) the planning of needs for the remaining of the project, e.g., the final conference.

During these months, **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 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

UOC ensured that all project-related files (research- and management-related) were managed and stored in the intranet created during the first reported period, and provided support to **EUSEA** for website-related actions (e.g., update of consortium activities, update of new members' profiles and their inclusion in the internal email lists).

As a result of a collective decision made during the intermediate meeting in Bristol (April 2017, Month 18) **UOC** together with **EUSEA** created an internal email list for research purposes including WP2, WP3 and WP4 partners.

Task 1.3 Scientific coordination and project monitoring

In this period **UOC** achieved **Milestone 3 (Mil.3)** on the **mid-term evaluation** and led the elaboration of **Deliverable 1.3 (D1.3) Evaluation report of the Advisory Board,** both timely submitted to the EC in April 2017 (Month 18) and October 2017 (Month 24).

On the one side, **Mil.3** provided an internal mid-term assessment of the progress of the PERFORM project (from Month 1 to 18) through the use of a specific set of indicators as means of verification consisting of (i) conventional indicators to monitor the progress of the project and (ii) RRI-related indicators developed through an internal participatory reflective process. To do that, **UAB** and **UOC** designed a **shared protocol of RRI implementation and reflection guidelines** to provide the PERFORM consortium with procedures to meet a set of RRI process requirements. A battery of 10 self-reflective questions were generated and answered by all PERFORM partners. **UOC** and **UAB** organized partners' answers and presented them in the intermediate meeting of the consortium in April 2017 (Month 18) to foster continuous self-reflection on the inclusion of RRI in the different stages of the project until the end of the project. This mid-term assessment showed that the PERFORM consortium was satisfactorily progressing towards the full achievement of its four objectives and was overall meeting the RRI requirements. It also showed, however, that partners needed to continue addressing efforts to enhance four particular aspects: i) inclusion of students with special needs in the participatory educational process, ii) early engagement of both teachers and researchers in the workshops, iii) collective reflection with participants about the process, and iv) critically approach gender issues in the design of the activities beyond ensuring both female and male participation. During the consortium meeting WP leaders committed to keep working in addressing these aspects.

On the other side, **D1.3** was the outcome of the PERFORM project mid-term assessment as well as the **report conducted by the PERFORM AB** based on the achieved results and objectives of the project during its first period, from November 2015 to January 2017 (Month 1-5). It represented a key input to improve and adapt PERFORM further development. The members of the AB who conducted the report were Roger Strand (University of Bergen, Norway), Daniel Erice (Alioth Arte y Ciencia, Spain), Emily Dawson (University College London, UK), Àgueda Gras (European Schoolnet, Belgium), and Frank Burnet (University of West England, UK). During the **fourth SC** meeting in April 2017 (Month 18) it was agreed that WP leaders would suggest two AB members to evaluate their work. **TBVT, UoB, UAB, UNESCO and EUSEA** suggested two or three members and **UOC** elaborated the final list. As for the specific outputs to review, **UOC** asked each AB member to assess the progress of his/her assigned WPs based on the interim technical report (first period: Months 1 to 15), as well as other specific documents (e.g., deliverables, internal reports). Within each WP, WP leaders and the CT suggested specific issues to AB members to focus on. Also, in parallel to such evaluation process, some WP leaders contacted members of the AB with specific expertise on the actions they were developing to ask for advice and guidance: **UoB** contacted Àgueda Gras and Emily Dawson, **UAB** contacted Daniel Erice, **EUSEA** contacted Frank Burnet, and **UOC** contacted Roger Strand. Sometimes it was possible that AB members also attended the activities (e.g., Daniel Erice attended one of the PW in Spain with **TBVT, UOC** and **UAB** and one in the UK with **UoB** and **SMS,** and held a meeting in Paris with **TRACES**).

The AB members provided their feedback according to a planned timing strategy. Documents and specific questions were provided to each AB member in June 2017 (Month 20), asking for them to send their feedback in mid July 2017 (Month 21). On the basis of this feedback and the WP leaders' reactions to it **UOC** sent back the report to the AB in early September 2017 (Month 23). Two weeks later a Skype meeting was held between **UOC** and the AB for the final check of

the report. The final version of the report was peer-reviewed by **TRACES** and **UNESCO** in October 2017 (Month 24) and delivered in due time: October 31st, 2017 (Month 24).

In parallel, during the reported period **UOC** held several meetings with the UOC library services in order to implement the Data Management Plan (DMP). In this regard, **UOC** created a Zenodo account for PERFORM and with the help of **UAB** produced two databases (Literature review analysis matrix and Survey variables matrix) that will be uploaded according to the DMP timing strategy.

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

During this period, **UOC, EUSEA** and **SMS** participated in **4 events within the Scientix network**, in which **UOC and other partners** established contact with other EC projects for exploring opportunities for further collaboration (e.g., NUCLEUS, CREATIONS):

- ECSITE Annual conference 2017 (June 15th-17th, Porto-Portugal)
- Science is Wonder-ful! (September 25th-27th 2017, Brussels-Belgium)
- 12th Scientix Projects Networking Event 'Gender and innovation in STE(A)M education' Scientix Future Classroom Lab (December 5th, 2017, Brussels-Belgium)
- Get Inspired by STEAM education! Webinar organised by the European Schoolnet (April 25th 2018, Online)

Specifically, the 12th Scientix Projects Networking Event in December 2017 (Month 25) was **co-organized by UNESCO** and **UOC together with the H2020 GEDII project**. To strengthen the links with other research projects, **UNESCO** invited other H2020 projects to participate in the event, such as the HYPATIA H2020 project (see Task 5.2. for further details).

As a result of these efforts, actions and activities through which links between the PERFORM project and Scientix were established, **UOC** achieved **Milestone 6 (Mil.6) on Links to Scientix** in April 2018 (Month 30). Direct communication and interaction with STEM education research projects and networks such as Scientix represented a joint effort among science education researchers and practitioners feeding PERFORM dissemination and outreach activities.

1.2.2 Work Package 2 (WP2): Innovative science education methods based on performing arts [Months 1-36]

During this period, **TBVT**, as WP2 leader, finished the transformation of D2.1 into a user-friendly toolkit that includes 11 videos and 9 short documents available at the PERFORM website. This user-friendly toolkit has been uploaded to RRI-Toolkits & Scientix web-pages.

As for Task 2.2, **TBVT, TRACES** and **SMS** with the support of **UAB, UOC, AJA** and **UoB** re-designed the participatory processes according to their local context, personal experience and the results of the WP4 impact assessment and conducted the second round of PW with more than 100 students participating among the three case studies.

TBVT also started to set-up Task 2.3 in Spain, in collaboration with CosmoCaixa Science Museum of Barcelona.

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

In February 2017 (Month 16), **TBVT** fine-tuned the analysis of the evaluation performed in this task and, with this result, finalized **Deliverable 2.1 Final Protocol of tested methods to**

transform a performance-based activity into a PERSEIA. D2.1 was sent for internal review to **UOC, UoB** and **UoW**, and submitted to the EC on time by the end of Month 16.

In Months 19 and 20 **TBVT** collected feedback from teachers in Barcelona participating in the task to refine some aspects of their role in the process of PERSEIA construction. In order to collect these feedback, short structured interviews where held. In addition to this, **TBVT** received feedback from AB members, which was taken into account to improve the outputs. With the feedback collected, from June to December 2017 (Months 20 to 25), **TBVT** produced the **user-friendly version of the D2.1** ("From drama-activities to raising scientific aspirations in secondary school students"), which includes 11 short videos and links to 7 documents that aim at disseminating the process to transform drama-based activities into scientific drama-based activities, based on RRI values, to raise scientific aspirations among secondary school students. This **user-friendly version** was produced to facilitate and replicate the methodology, activities and results obtained in Task 2.1 by other stakeholders. The videos are available at the YouTube channel and website of the PERFORM project (see also Task 6.1), and the **user-friendly version of the D2.1** is also available at PERFORM, Scientix and RRI-Tools webpages.

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

This task was composed by three different phases. The first phase included the first round of workshops that were conducted in 5 participant schools (from low and medium socio-economic level) and was conducted from January 2017 (Month 15, as reported in the intermediate report) till May 2017 (Month 19). **TBVT**, **TRACES** and **SMS** were the partners responsible of delivering the PW and organizing the collaboration of teachers and ECRs. **TBVT,** as WP2 leader, coordinated the three case studies and met with **TRACES** and **SMS** twice during March 2017 (Month 17) to supervise the final implementation schedules and review the overall strategy. In-between PW sessions, **UAB** researchers shared with **TRACES** and **TBVT** impressions related to the observations, and **UoB** did the same with **SMS,** providing informal feedback around punctual aspects. From February to May 2017 (Months 16 to 19) **TBVT** collected the parental consents of the participant students, teachers and ECRs in the Spanish case study. **SMS** in UK and **TRACES** in France also collected the informed consents in their case studies. **132 students, 11 teachers, and 15 ECRs** were involved in these workshops.

The second phase (March 2017 to January 2018; Months 17 to 27) included the redesign of the PWs based on the results of the assessment conducted in WP4 by **UAB** and **UOC**. **TBVT** drafted a strategy to redesign the PW in collaboration with the rest of the partners, which was discussed during the Consortium Meeting in Bristol in April 2017 (Month 18). This included the development of the Performers-ECR-Students-Teachers (PEST) alliance in each case study, an idea suggested by **AJA,** to implicate more in-depth both ECRs and teachers during the PWs. **TBVT** together with **SMS** and **TRACES** coordinated the redesign of the PW tasks and timeline. In France **TRACES** worked together with **AJA** in the redesign of the workshops, while in UK and Spain **SMS** and **UoB** and **TBVT, UAB** and **UOC** respectively did the same. Online and offline meetings were held between partners to finishing and reviewing the plans for the second round of workshops. **TBVT** ensured that the modifications agreed were implemented and that all the information on the redesign was reported to **TBVT** in order to prepare the Deliverable 2.2.

As a result of the redesign of the PWs, **TBVT** designed 8 PW, **SMS** 4 PW, and **TRACES** 8 PW, including the delivery of the final PERSEIAs. **TBVT,** as WP2 leader, coordinated the designed across the three case studies, supervised the final elaboration of the protocols and reviewed the overall strategy.

Finally, the third phase, consisting on the preparation and implementation of the second round of PW in 7 schools in the three case studies took place from November 2017 to May 2018 (Months 25 to 31). **TBVT**, **SMS** and **TRACES** were responsible of delivering the PW and organizing the collaboration with teachers and ECRs following the PEST alliance strategy.

In Barcelona, during November and December 2017 (Months 25-26), **TBVT**, with the help of **UOC** and **UAB**, presented the project to the teachers of the two secondary schools involved (IES

Consell de Cent and IES Moises Broggi) by organising three meetings. The first one gathered all teachers of both schools to explain the overall aims of the project while the second one was addressed to the teachers directly involved in the workshops to discuss the activities and present the evaluation strategy, so as to include teachers' views. The third meeting involved teachers and participant ECRs to put in common the main values to be transmitted to the students throughout the workshops. **TBVT** also shared with involved teachers and ECRs in both schools a detailed description of activities through an on-line platform before the workshops.

Similarly, in the UK, from November 2017 to January 2018 (Months 25-27), **SMS** implemented coordination meetings (by phone) with teachers from the three participating schools (Castle school, Bristol Free, Bridge Learning Campus) to set out aims and objectives of the project, timetables, commitments and facilities required, as well as to take into account the vision and opinion of the teachers. **SMS** and **UoB** shared the detailed description of all the participatory activities included in the UK process by direct email with teachers and ECRs in order to ensure that all of them had access to all the information needed for correct implementation of the workshops. **SMS** also supported ECRs either by email or Skype in the development of their busking presentations to students (also as part of Task 3.2).

In France, **TRACES** started the preparation meetings with teachers and ECR earlier than in the other case studies. In September 2017 (Month 23) **TRACES** organized meetings with the teachers of the two participant schools (Cesaria Evora School – Montreuil, and Mendès France School – Villiers-le-Bel). In November 2017 (Month 25), teachers, ECRs, science facilitators and performers met during the training organized by **AJA** to share and prepare the PW (see also Task 3.2). In this training ECRs practiced how to explain and share their research topics by using gamification and concrete objects, photos and videos. Then in January and March 2018 (Month 27 and 29) **TRACES** organized two other meetings with ECRs, performers, teachers and science facilitators at each participant school.

TBVT, SMS and **TRACES** conducted the second round of PWs in the **7 schools** (2 schools in Spain, 3 in the UK, and 2 in France) with the participation of **121 students, 19 teachers, and 29 ECRs** from January 2018 to June 2018 (Months 27 to 32). In the UK, **UoB** coordinated the participation of 11 ECRs, facilitated some aspects including reflection sessions, research exercises and introductions to RRI, and arranged and facilitated the final PW workshop at Castle school, which was postponed due to snow, and **SMS** were unable to attend.

In order to ensure the correct implementation of each PW in Spain and UK, **TBVT** and **SMS,** together with **UoB,** conducted coordination contacts with teachers and ECRs via email some days before the PW, reminding them their associated tasks in that specific PW. Also, coordination meetings with ECRs before and after each PW took place to ensure their correct participation in the PERFORM activities. Further, in the UK where the ECR training overlapped with the PW, **UoB** led regular email reflections with ECRs following the workshops. This enhanced the ECR experience and helped to strengthen relationships and collaborative work amongst the cohort. **TBVT** also arranged an informal social reflection evening with the ECRs following the final workshop in March 19th, 2018 (Month 29). In France, **TRACES** organized meetings between PWs with the ECR and teachers involved to adjust and improve the next PWs.

In sum, participants of the first and second rounds conducted in the three case studies included a total of 253 students, 30 teachers and 44 ECR (Table 3):

Table 3. Total number of students, teachers and ECRs involved in the execution of the participatory process in each school per case study. LSL-Low Socioeconomic Level. MSM-Medium Socioeconomic Level.

Case Study	School name and location	Students	Teachers	ECRs
Spain	IES Santa Eulàlia, Terrassa (LSL)	29	3	3
	IES Castellbisbal, Castellbisbal (MSL)	30	2	3
	IES Consell de Cent, Barcelona (LSL)	19	3	5
	IES Moisès Broggi, Barcelona (MSL)	20	2	6
UK	Fairfield High, Bristol (LSL)	29	2	7
	Bridge Learning Campus, Bristol (LSL)	18	3	3
	Bristol Free School, Bristol (MSL)	9	2	4
	The Castle School, Thornbury (MSL)	16	4	4
France	Collège Marie Curie, Paris (LSL)	24	2	1
	Collège Les Toupets, Vauréal (MSL)	20	2	1
	Collège Césaria Évora, Montreuil (MSL)	21	2	2
	Collège-Lycée Pierre-Mendès France, Villiers-le-Bel (LSL)	18	3	5
TOTAL		**253**	**30**	**44**

As a result of this work, **TBVT** produced the **Deliverable 2.2** "**Final protocol of tested methods to generate a transformative participatory educational process by using science and arts-based educational approaches**". D2.2 includes the detailed description of all the drama-based science education activities implemented in the participatory educational process conducted in the three case studies of the PERFORM project. D2.2 was sent for internal review to **UOC**, **UAB** and **AJA**, and submitted on time by April 2018 (Month 30).

Simultaneously, since January 2018 (Month 27), **TBVT** have been working on the production of a **user-friendly version** of D2.2, in order to facilitate its use and replication by other stakeholders. This user-friendly version will contain a series of videos produced by **TBVT**, in collaboration with **SMS** and **TRACES**, as well as links to documents that will include practical information about the participatory process and the description of the PWs conducted in the three case studies. The videos will be uploaded to the YouTube channel and website of the PERFORM project. The postproductions of videos are expected to be finished by end-June 2018 (Month 32).

Busking at Fairfield High School, Bristol, by Science Made Simple

Students, teachers and ECRs from IES Moises Broggi, Barcelona, just before their PERSEIA performance

Participatory Workshop at Collège-Lycée Pierre-Mendès France, Villiers-le-Bel, Paris, by TRACES

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

TBVT initiated this task in October 2017 (Month 24) to be conducted in Spain in collaboration with CosmoCaixa Science Museum of Barcelona. The first action was to review the dissemination activities addressed to secondary school students in CosmoCaixa by the science museum facilitators. In December 2017 and January 2018 (Months 26 and 27) **TBVT** reviewed 6 guided dissemination activities consisting of a 45 minutes talk inside the CosmoCaixa facilities focused on a specific exhibition: Forest Sustainability; Life & Evolution; Antarctic Base; Brains; Trix, the best conserved T-Rex in Europe & Fossils. These activities were reviewed in order to explore the best approach to adapt PERSEIAs to an informal learning setting for secondary school students.

From December 2017 to April 2018 (Months 26 to 30) **TBVT** prepared a report of good practices and tips to include the main results and conclusions of PERFORM project into "Science Museums Guided Dissemination Activities", i.e. to include the human dimension of science and the values embedded in the RRI.

In April 2018 (Month 30), a coordination meeting was held with CosmoCaixa Science Museum representatives in order to coordinate the implementation of a Knowlede Sharing Workshop between **TBVT** and CosmoCaixa facilitators, in which the report prepared by **TBVT** was reviewed and adapted to the reality of a Science Museum.

Also, a three-days training to CosmoCaixa young Science Museum facilitators have been agreed between **TBVT** and CosmoCaixa, in order to train them to prepare their own guided science dissemination activities including the human dimension of science and the values embedded in the RRI. This training will be implemented in July 2018 (Month 33)

1.2.3 Work Package 3 (WP3): Building science education and communication capacity for teachers and early career researchers [Months 1-36]

During the reported period **UoB**, as WP3 leader, coordinated and completed the first phase the ECRs training (April 2017, Month 18) with the support of **UOC, UAB, TBVT, TRACES, SMS** and **AJA** and carried out an evaluation of all the ECR training programmes in order to inform the second phase of the training that was also conducted in this period. **UoB** also fed AB feedback in to the development of the trainings for ECR, and the toolkits design.

From October 2017 (Month 24), the second phase of ECR training took place in each of the three countries. In Bristol, **UoB** coordinated and carried out the course of ECR training workshops including seminars delivered by academics from **UoB** and **SMS** at the **UoB** campus for a cohort of 11 ECRs. Two final workshops by **UoB** and **AJA** will complete the Bristol course in May 2018 (Month 31). The second round of ECR training was delivered in Barcelona with seminars delivered by **UAB, TBVT, UOC, UoB and AJA** at the **UAB** campus for a total of 15 ECRs. In Paris the second phase of ECR training was delivered across two days by **AJA and TRACES** for a total of 9 ECRs. An evaluation report of the second round of ECR training is being produced by **UoB** in May 2018 (Month 31), in order to inform the ECR toolkit development and dissemination of toolkits.

UoB also used AB feedback for improving the development of the trainings and toolkits design for teachers. The first teacher training was delivered by **TBVT** with 4 teachers in Spain in July 2017 (Month 21). This was filmed and evaluated by **UoB,** in order to inform the development of future training for teachers in all countries. The first round of teacher training in Bristol was delivered by **UoB** in October and November 2017 (Months 24 and 25) with 33 teachers participating. In February 2018 (Month 28) **TBVT** led a PERSEIAs show for secondary school teachers to motivate them to take part in the second round of training in Barcelona, scheduled for July 2018 (Month 33). In Paris one full day of teacher training was delivered by **TRACES** in April 2018 (Month 30) for 5 teachers. In January 2018 (Month 27) **UoB** produced the

internal evaluation report "Teacher Training for PERFORM: WP3" relating to the first round of teacher training.

In August 2017 (Month 22), **UoB** began planning the toolkits for teachers and ECRs - D.3.1 and D.3.2 - that will share learning and best practice from the training programmes in PERFORM. From January (Month 27) advances were made with the development of the two toolkits; consulting with focus groups and developing content with partners, commissioning a media company, graphic designer and an illustrator.

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

This task was fully completed and reported in the intermid report (M1-M15).

Task 3.2 Development of training and guidelines for researchers

In April 2017 (Month 18), the first training for ECRs in the UK, the last of the three countries' training programmes, was completed. The **first round of ECR training programmes** in the three countries were broadly successful and reached **54 researchers in Spain, 8 ECR in the UK and 4 researchers in France**.

Reflective sessions with participant ECR were conducted in the three countries. In the final session of the UK training in April 2017 (Month 18), the cohort of ECR came together and reflected on their experience in the project and what they felt could be usefully learned and applied for future participants in the project. In France, in February 2017 (Month 16), **AJA** met the ECRs involved in the workshops in Paris to reflect on their experience in the project. Similarly, in Spain, in Month 17, **TBVT** met the ECRs involved in the workshops in IES Castellbisbal, Barcelona, for a reflection session that was recorded, and short videos were sent to **EUSEA** (WP6 leader) for dissemination purposes. Also in Barcelona, in May 2017 (Month 19), an evaluation expert from **UoB** visited ECRs to gain their feedback via a group interview held together with **UAB** and **UOC** (see also Tasks 4.3 and 4.4). The outputs of these sessions in the three case studies, plus observations from the training sessions fed in to an **internal evaluation report**, which outlined key findings from the first phase of training, and recommendations for the development of the next phase. This report was shared with all partners and gave them the opportunity to learn from the successes of the different formats and approaches to ECR training in the different countries. The report also formed the basis of WP3 report to the AB.

From May 2017 (Month 19), work began in the three countries to **redevelop the training for the second phase of the project**. In France, **AJA** presented their redesigned plan and call documentation in July 2017 (Month 21). The new design reduced the time requirement to 2 days, in order to increase ECR applications, included more practical application of the theoretical material covered and introduced fun games to encourage greater engagement. Beyond ECR, teachers, performers and science communicators from **TRACES** were involved in this training with two objectives: (i) to build, with the ECRs, their speeches and gamification of their research and their daily work; and (ii) to build a common culture between the teachers, the ECRs, the science facilitators and the performers.

In the UK and Spain, in response to feedback regarding a perceived disconnect between the experience of the training and that of the PW, while keeping the same theoretical themes, the practical aspects of the sessions were more grounded in preparing ECR for their increased role in the workshops in schools. In this regard, in the UK in August 2017 (Month 22) **UoB** and **SMS** met to discuss how to improve the alignment of the training and participation of ECR and teachers in the PW schools. This led to the addition of more substantial science busking training for ECR and teachers, and practical workshops tailored to the more substantial role for ECRs in

the second phase of PW. The timing of the training programme was also changed to run prior to the PW, rather than alongside, as it did in the first phase of the participatory educational process.

In the case of Spain, in July 2017 (Month 21), **UAB** and **UOC** met to redesign the training. Also, **UAB** and **UOC** met **UoB** that same month to discuss the proposal and to coordinate with the rest of trainers the specific design of the sessions. In September 2017 (Month 23), a meeting between **UoB**, **UAB** and **UOC** took place to make a follow-up of the design of the different sessions and agree on the final programme. As a result, two further sessions were introduced: one focused on Science in Society presented by **UOC** in collaboration with **UoB,** and a session prior to the PW to prepare the researchers for their roles in schools' workshops, delivered by **TBVT**. To make the correspondent arrangements, **UAB** met the UAB postdoctoral school in July 2017 (Month 21) and October 2017 (Month 24) to tailor the training offer and advertising to encourage strong cohort development. Besides **UAB** and **UOC, TBVT** disseminated information about the ECR training through their webmail list and social networks in March 2017 (Month 17) and a symposium in Parc Científic de Barcelona in September 2017 (Month 23). In October 2017 (Month 24), **UAB** made all the logistical arrangements for the training programme and coordinated and managed the contact with interested ECRs.

The second round of ECR training started in October 2017 (Month 24). **A total of 35 ECR participated across the three case studies.**

In the UK, **UoB** coordinated and carried out the ECR training in Bristol. A series of 8 workshops were all delivered at the **UoB** campus between October 2017 - April 2018 (Months 24 – 30) with seminar contributions from **SMS** and academic staff from **UoB** for a consistent cohort of **11 ECRs,** 5 male and 6 female (7 PHDs, 2 Post-docs, 1 Research project manager, 1 Research associate from various fields of research). Initially 16 ECRs signed up but 5 had to leave due to clashes with research timings. There are 2 additional workshops to be delivered in May and June 2018 (Months 31 and 32) by **UoB** and **AJA**. The course otherwise included 8 speakers from across **UoB** and 2 from **SMS** (Table 4).

Table 4. Sessions from the training course in Bristol.

Session	**Topic**	**Partner**
25 October 2017	*Science Busking*	**SMS**
1 November 2017	*Philosophy in Science*	**UoB**
8 November 2017	*Ethics*	**UoB**
15 November 2017	*Reproducibility and Trust in Science*	**UoB**
22 November 2017	*Communicating Your Topic to young people*	**UoB**
29 November 2017	*Science Busking*	**SMS**
6 December	*Responsible Research and Innovation*	**UoB**
24 January 2018	*Schools workshop preparation*	**UoB**
3 May 2018	*Reflection session*	**UoB**
*6 June 2018 (re-scheduled from 18 April due to French transport Strike).	*Standpoint Theory & Fem epistemologies*	**AJA**

One key objective of the ECR training course in Bristol was to prepare the cohort of ECRs for their experience in schools as part of the PW delivered in WP2 (see also Task 2.2). The training course was also designed by **UoB** to help build good working relationships within the cohort of ECRs, to support their collective experience in the schools and also to enable constructive networking. Therefore, **UoB** held regular de-briefs with ECR both informally in conversation and formally via email to reflect on experiences and concerns. As well as this, after the final PW, **UoB** held a social event to de-brief informally on the ECR experience of PW in schools with an overwhelmingly positive response. One key change implemented for the second round of PW in Bristol related to the role of the ECR: the school students were asked to develop their performances based around the specialism of the ECR. This had a positive impact on the input the ECR was able to make, as well as the relationship they were able to develop with the students. Evaluation of the impact of the ECR training will be further explored in a reflection session in Month 31 which will be led by **UoB** with support from **UAB** and **UOC** evaluators.

In Barcelona, the second ECR training was implemented at the UAB campus in November and December 2017 (Month 25-26). The course consisted of 6 seminars delivered by different PERFORM partners including **UAB, UOC, UoB, TBVT** and **AJA** and were delivered in English, although Catalan and Spanish were used as support in small group activities and discussions (Table 5). In addition, an extra optional session was organized by **TBVT** in which ECRs and teachers worked together in the PW protocols in order to facilitate the PEST alliance. In a change from the first round, a call was made for a maximum of 20 ECR who were willing to participate in the school workshops (with participation being confirmed during the training course). Workshops were delivered for a consistent cohort of **15 ECRs** (13 female and 2 male; 13 PhDs and 2 Post-docs) from various fields of research (11 of these went on to participate in PW in schools).

Table 5. Sessions from the training course in Barcelona.

Session	**Topic**	**Partner**
2 November 2017	*RRI Introduction*	**UAB, UOC, TBVT**
9 November 2017	*Responsible Communication Responsible scientific communication*	**AJA**
16 November 2017	*Critical Engagement & Participation*	**UoB**
25 November 2017	*Ethics of Science*	**UoB**
30 November 2017	*Science in society*	**UOC, UoB**
1 December 2017	*Performative session Monologue creation!*	**TBVT**
14 and 20 December 2017	*P/FEST meetings at schools : informative session with teachers and researchers*	**TBVT**

Feedback from the ECR participants in Barcelona was collected through an online form after the workshops (7 ECRs answered the survey) by **UAB** and **UoB**. ECRs rated their degree of satisfaction with the training with scores between 8 and 10 out of 10. ECRs especially appreciated the opportunity to: i) reflect about aspects of research commonly taken for granted (or ignored in their academic training, such as ethics or philosophy), ii) interact and discuss with researchers from very diverse disciplines and iii) approach a different communication format (i.e. scientific monologues) and learn how to communicate their research in a simpler way and more linked to society. Some ECR also proposed having longer sessions to delve deeper in the topics.

In November 2017 (Month 25) the second phase of ECR training was delivered in Paris, across two days by **AJA** with participation from **TRACES.** In Paris **9 ECRs** took part in the training: 6

women and 3 men, post docs, from various fields of research. A total of 6 training topics were covered (including two additional follow up sessions in Month 27, Table 6). **TRACES** delivered these two further sessions, one at a mid-point in the PW for teachers and researchers to reflect together about the work they were doing, and one following the PW to reflect on their experience in the process. **TRACES** also attended a training session explicitly focused on developing the PEST alliance –working together to build common values. All took place at **TRACES** premises: Espace Pierre Gilles de Gennes, Ecole Supérieure de Physique Chimie Industrielles de la Ville de Paris, Paris.

Table 6. Sessions from the training course in Paris in Month 25.

Session	**Topic**	**Partner**
28 & 29 November 2017	*Individual reflexivity about one's own research* *Values in Science* *Gamification of research* *Standpoint Theory*	**AJA, TRACES**

Feedback was collected from the French ECR cohort by **AJA.** The ECRs were happy to be introduced to literature about values and feminist epistemology. Most participants were already aware of these issues and perspectives but lacked references to literature to support their perspectives. They were highly satisfied by the perspective of collaborating with the teachers from one of the schools, while for the other there was slightly less enthusiasm but still a very positive feedback. The connection with the artists from **TRACES** was excellent, as they took part in the whole training. The ECRs were looking forward to going into schools for the PW.

From August 2017 (Month 22), **UoB** began the design of toolkits, and identified opportunities within the ECR training programmes to gather material, and engage trainers to provide input to the materials that will be produced. In response to the way that the wider project has developed and learning we have made along the way, the toolkits will be produced concurrently with the second phase of training, rather than in advance of. **UoB, UOC, UAB, TBVT, TRACES, SMS** and **AJA** will make the most of the networks of researchers they have recruited in the three case studies to feed in to and feedback on and test the toolkit resources. In addition, **UoB** is making relationships with individuals in institutions that provide training to researchers who would be willing to provide feedback and potentially test the resources produced – one such relationship has been made with staff development officers at the University of Sheffield. To pursue this, **UoB** presented PERFORM's ECR training at the Engage conference in Bristol in December 2017 (Month 26, see also Task 6.2).

In May or June 2018 (Months 31-32), two 2-hours sessions are planned in order to debrief with the ECRs, after the PWs in the schools finished. **AJA** will also be working with the ECRs on adapting the communication skills they used in the school settings, for other professional purposes for example to create a poster session for a conference. Further information and observations relating to the second round of ECR trainings in each country have been gathered by a specialist evaluator at **UoB** for an evaluation report on the second round. This report will highlight key points of learning in relation to the ECR experience across PERFORM, in order to inform the development of the ECR toolkit, assist the final reporting and the final PERFORM final conference.

In January 2018 (Month 27) **UoB** began working closely with **AJA** to produce a set of resources that draws together the most effective, current and valuable elements of the ECR training from the three case studies. It is designed to be used by higher education institutions responsible for

training ECRs and independently by ECRs. This ECR toolkit intends to guide young researchers to strengthen reflexivity around their research practices and understanding of RRI values as well as build their communication skills and understanding of the value of using creative approaches to public engagement. The toolkit will include two main corresponding elements: a set of written guides and a collection of 4 short videos. The videos will present 4 speakers who contributed to the training workshops in Bristol including academics from **UoB** and **AJA**. Media Company New Leaf Video has been contracted to work with **UoB** to produce the films. Filming of the videos commenced on April 2018 (Month 30) and a post-production schedule is in place for all videos to be edited and subtitled and delivered by end June 2018 (Month 32). Plans are underway to contract a graphic designer to design the written resource.

A schedule of consultations and review is in place to ensure the toolkit development makes the most of input and advice from partners, relevant specialists and potential end-users. First drafts were sent to the PERFORM consortium for review and feedback on in March 2018 (Month 29). **UoB** are in communication with an external focus group made up of specialists in RRI and public engagement/performance from the UK, Spain and France. As such the development of this set of resources is informed by collaboration and review with PERFORM partners and external partners as well as the evaluation reports produced by **UoB** after first and second rounds of ECR training.

During this period, **UoB, UAB** and **UOC** also collectively worked on adapting PERFORM ECR training sessions to an online format for a **UOC** training course to introduce researchers in the RRI approach, which was also inspired by the materials produced by other H2020 projects on RRI such as HEIRRI and RRI-Tools. The online course was launched by **UOC** in February 2018 (Month 28) under the supervision of the PERFORM project coordinator, with **13 participants** who actively discussed and reflected on RRI issues within their own research practices during two months.

Task 3.3 Development of training and guidelines for teachers

Training sessions for teachers were devised by **UoB** in collaboration with project partners **TBVT** and **TRACES** in accordance with the PERFORM goals: 1) the exploration of science education methods based on performing arts as innovative ways to engage secondary school students in STEM; and 2) the promotion of teachers' and researchers' communication and education capacity building to provide students with valuable learning experiences in formal science education contexts.

In July 2017 (Month 21), the first teacher training session was delivered by **TBVT** in Barcelona, hosted by the summer school of the Institute for Education at UAB. **UAB** and **TBVT** advertised the course through their networks, as well as with the schools involved in the first stage of the PW, and **four teachers** attended a training on 'developing a PERSEIA for your science teaching'. The course was filmed and evaluated by **UoB**, giving input to inform the development of the next phase of teacher training in Spain, as well as the teacher training development in the UK and France. The programme was positively evaluated by the teachers involved, and **TBVT** had some clear feedback as well as their own perspective on what might be usefully changed in future as well as what would be worth sharing in toolkit resources. A second round of Barcelona teacher training was planned by **TBVT,** in discussion with **UAB** - and in response to feedback received from **UoB** - and will take place in July 2018 (Month 33) as part of the summer-school that ICE-UAB offers to teachers in Catalonia. In preparation for this, **TBVT** led a PERSEIAs show for secondary school teachers in February 2018 (Month 28) in order to motivate them to take part in the summer course.

In the UK, planning for the teacher training began in May 2017 (Month 19). Feeding from conversations with teachers in schools involved in the project **UoB** decided that the training should focus on philosophical techniques for discussing complex topics in science, and performance techniques for science teaching. **UoB** worked with the Centre for Science and Philosophy (UoB) to develop a training entitled Philosophy in the Science Classroom. A further

training, Performance in the Science Classroom, was developed by **UoB** in collaboration with theatre company Kilter. These two professional development sessions were delivered as evening workshops by **UoB** in October and November 2017 (Months 24 and 25).

The aim of this first workshop *Philosophical dialogue in the science classroom* was to give teachers techniques to encourage a more participatory dialogue in the classroom, to use philosophical dialogue to support curriculum understanding, foster a deeper understanding of science and enhance pupil engagement. This took place in October 10th, 2017 (Month 24) at We The Curious, a science museum in Bristol, and it was attended by 14 teachers (21 teachers registered for the session). It was evaluated very positively, with some useful feedback. Based on this feedback and the trainers' experiences, this training will be redeveloped and is scheduled for delivery again in May 2018 (Month 31).

The second workshop *Discover performance techniques to enhance student engagement in science*, led by immersive theatre company Kilter, introduced teachers to a range of innovative performance approaches to explore scientific concepts with young people. This workshop gave teachers the opportunity to experience these techniques first hand and collectively reflect on ways to integrate these into science lessons to support the curriculum. The techniques are particularly designed to encourage students who typically do not engage with science lessons. This workshop took place in November 8th, 2017 (Month 25) at the Watershed Arts Centre in Bristol: 19 teachers attended the session (35 teachers registered). The training was similarly evaluated and redeveloped for a second phase of training in May 2018 (Month 31).

In France, development and planning for the teacher training was led by **TRACES**. **TRACES** took the learning and feedback from the ECR training (see Task 3.2) to build a second training for the teachers involved in the PWs and a wider audience of invited teachers from their network, developing the ideas around working with ECRs, tools for talking with young people about science and grand challenges, and using performance techniques for science teaching. Advertising for this second training began in October 2017 (Month 24), with invitations being sent out to teachers in the **TRACES** network of over 950 individuals and schools, and the closing date for applications was end of February 2018 (Month 28). The second training took place in a 1-day session in April 2018 (Month 30) at **TRACES** offices within the ESPCI. 10 teachers signed up but the final number of participants was **5 teachers**, due to the social movement and strike. The content of the session included cooperation games, theatre games, mind-maps to collect and gather ideas and stereotypes about science and research, case studies for questioning the production of scientific knowledge, examples of life experiences and careers of different researchers, and games about science controversy.

In January 2018 (Month 27) **UoB** produced an internal report evaluating the first round of teacher training, with a focus on the first rounds of teacher training in Barcelona in July 2017 (Month 21) and in Bristol in October & November 2017 (Month 24 & 25). Collaborative discussions with all partners as well as the recommendations from this report (which was shared with partners) helped to shape the second phase of teacher training. A key recommendation from the evaluation report was that training sessions for teachers must be specifically tailored for them and must endeavour to work to encourage two-way, participative communication between teachers and students and amongst students. Teacher feedback indicated that both of the sessions trialled in Bristol (on philosophical dialogue and performance techniques) included useful techniques with potential to be applied in the classroom.

In January 2017 (Month 27) **UoB** began to progress the design of the toolkit. This toolkit is being produced in conversation with teachers and education experts in the three countries and informed by the evaluation from the first round of teacher training and subsequent evaluation report (produced by **UoB** in Month 27). The first draft outline was reviewed by staff within **UoB** networks and **UOC** in March 2018 (Month 29). The revised first draft of the document was sent for review to the Perform consortium in April 2018 (Month 30) and in Month 31 the second draft will be sent to an external focus group including:

- Attendees from the **UoB** led PERFORM teacher training
- Participant teachers from the PWs in three Bristol schools
- Participant teachers from PERFORM workshop at ASE conference in January 2018
- Scientix European teacher's network
- Education partners in France and Spain

In its current draft, the tool kit has three main sections. First, case studies and best practices resulting from PERFORM in the form of teaching cards presenting performance activities with corresponding RRI illustrations, plus 6 bite-sized videos showcasing 6 ECRs from across PERFORM. Second, guidelines on the practicalities of setting up and resourcing a PERSEIAs project and working with school students in the form of a pdf document, graphically designed. Third, background information on PERFORM and guidelines on how to develop the skills needed for a PERSEIAs project in the form of a 1page concise document with link to video from deliverable 2.2.

Plans are in place to move forward with two key elements of the toolkit. Firstly, the teaching card resource: **UoB** have commissioned an illustrator to produce 6 artworks to illustrate 6 questions relating to RRI and scientific research. Secondly, the filming of 6 short videos by Media company New Leaf Video. 6 ECRs from across the project (2 from Bristol, 2 from Paris and 2 from Barcelona) have been engaged and are being interviewed and filmed for this resource during Months 30 and 31.

ECR Science busking workshop, Bristol

Teacher training workshop, Bristol

ECR training session, Barcelona

Teacher training workshop, Paris

1.2.4 Work Package 4 (WP4): Impact assessment of the participatory educational process in students' engagement in and learning about science [Months 1-36]

During the reported period, **UAB**, as WP4 leader, supported by **UOC,** coordinated and implemented **the assessment instruments in the 12 secondary schools** participating in the workshops since January 2017 (Month 15). This included observations of all PW and a formative evaluation tool during the development of the participatory educational process, as well as the implementation of assessment instruments once the workshops were over (i.e. students' surveys and focus groups, and interviews to teachers and ECRs).

From March to July 2017 (Months 17 to 21), **UAB** and **UOC** analysed data generated from the first round of PWs. As a result of such **analysis**, **four internal reports** were generated in each case study, each corresponding to one of the four implementation goals of the PERSEIAs: 1) Interaction between students and ECR, 2) Quality of the resultant performances, 3) Transversal competences, 4) RRI values. These reports were discussed with **TBVT, TRACES** and **SMS** and informed the redesign of the PW for the second round.

Between September and December 2017 (Months 23-26), **UAB** supported by **UOC** worked on the redesign and refinement of the assessment strategy and tools to be implemented during the second round of PW. Such redesign was based on the insights and reflections generated during the analysis of the first implementation, the new design of the PW in schools shared by **TBVT, TRACES** and **SMS** and the feedback provided by the AB in August 2017 (Month 22). **UAB** supported by **UOC** implemented the new assessment strategy between January and June 2018 (Months 27 and 32), before, during and after the participatory workshops in the three case studies, with the support of **SMS, TRACES, TBVT** and **UoB**.

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

This task concluded in Month 10. **UAB** and **UOC** continued working on the two research articles generated with results from the task.

The article entitled *'Responsible Research and Innovation Indicators for Science Education Assessment: How to Measure the Impact*?' was accepted for publication in the International Journal of Science Education (Q1, IF:1,85) and published online in October 2017 (Month 24). It is currently available at the following permanent link of the journal (gold open access), the PERFORM website and **EUSEA** shared it through social channels (Facebook and Twitter). The article was also shared on RRI-tools resources repository.

The other article is currently under review at *Research in Science Education*.

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

UoW completed **Milestone 4 'ICT development of an automated tool to enable social media data analysis'** in October 2017 (Month 24). To do that, **UoW** conducted research on students' reception of PERFORM engagement activities on Twitter, WhatsApp and Instagram, which were conducted in Task 2.1 in Spain during the first reporting period. **UoW** developed a social media analysis tool which was calibrated to automatically gather and analyse discourse about science performances. Iterative testing and improvement of the tool was implemented to enhance its validity and reliability. The tool analysed responses as they come in, producing analytics in real time. The tool gathers tweets related to the different PERFORM activities from the social media Application-Programming Interface (API) for Twitter and Instagram for processing. During the period up to June 2017 (Month 20), **UoW** ran the tool for several on the collection side, and the analysis from onwards (to the end of the project in Month 36).

UoW faced key challenges in accessing social media data in the UK and France cases due to schools' regulations on the use of social media by students. Therefore, this tool focused on the overall project level and Spain case in terms of data collection. The tool handled data in Spanish, English and other languages, with the help of a Google Translate filter that operated automatically. Results from the tool will be included in Deliverable 4.2 on the social media responses and impacts from the project engagement with young people by **UoW** (due on September 2018, Month 35). D4.2 will also include a research report about the nature of sharing (through social media and other pathways) that occurs for young people engaged through PERFORM in which the **UoW** team worked since June 2016 (Month 8). Among other things, the results showed that even when young people engaged by the project were positively disposed to all aspects of the project, they were reluctant to reveal this positivity in their social media personas for fear of being perceived as 'too keen'. The research is underpinning two blog posts being produced for the Public Understanding of Science journal blog (https://sagepus.blogspot.com).

The work on D4.2 was fleshed out and nearing completion as of April 2018 (Month 30). As of Month 30, an up-to-date literature review on social media audiences was developed and added to the empirical findings to create a full picture and a research deliverable suitable for submission to a peer-reviewed journal.

A full empirical research of D4.2 based on social media and interview data will be circulated in the final reporting period months (Months 31-35) for review by the broader PERFORM research team. The research that was prepared for D4.2 revealed important patterns around the following themes:

- Why students value social media and their general patterns of use of this digital dimension of their social lives

- How social media modulates students' reception of science communication
- How and why PERFORM activities were shared through social media (or not)
- Implications of social media dimension for science communication practice

In addition, the research results presented at different forums by **UoW** (see also Task 6.2) and related discussions helped to clarify how best to frame the research outputs from this aspect of the project to be most appealing and helpful to practitioner and academic audiences and will be taken into account in D4.2.

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

UAB and **UOC** explored students' acquisition of transversal competences as a result of their engagement in the participatory educational process in each case study during the two stages of PW implementation in 2017 and 2018. This was done through assessing students' inputs provided in the surveys (as a first quantitative approach) and observations of the PW complemented by students, teachers and ECRs inputs through focus groups and interviews (as a qualitative in-depth approach). Such assessment was conducted before, during and after the PW.

In the first round of PWs, between February and June 2017 (Months 16 and 20), **UAB** with the support of **UOC** continued with the implementation of the assessment tools foreseen in the assessment strategy and reported in the first report period. First, systematic observations from all the PW were gathered. Observations were then triangulated with the development of a focus group with selected students, a group interview with involved teachers and a group interview with ECRs. The questionnaire implemented before the PW was delivered again to students after the PW to track the changes in their answers and to provide feedback about the process (see also Task 4.4). Furthermore, during the PW, **UOC** and **UAB** with the support of **TBVT, SMS** and **TRACES** provided a learning chart devised to foster students' reflective thinking and learning to learn skills, by inviting students to reflect about: i) their motivation to learn, ii) their learning outcomes, and iii) the way they had learnt it.

The three case studies followed the same implementation strategy, although the specific tools were adapted to each local context and PW implementation approach. While the observation guide and pre- and post-surveys were already designed in the first reporting period, **UAB** and **UOC** worked on the design of the focus group and group interviews between March and June 2017 (Months 17 and 20). A general design was made taking into account the assessment criteria and indicators identified in Task 4.1, which was then adapted to each case study taking into account preliminary results from the observations and the pre- and post-surveys.

In the case of France, **UAB** conducted structured observation of the PW and students' performances in the two participant schools during the first round of PW, which were video-recorded by **TRACES**, following the audio-visual recording guidelines prepared by **UAB**. Between May and June 2017 (Months 19 and 20) **UAB** and **UOC** conducted a 1.30-hour focus group with 10 students in Collège Les Toupets and 9 students in Marie Curie. Pre- and post-surveys were also implemented with 19 and 22 students participating in the PWs in each school, and 31 and 17 students who did not participate. A 1-hour group interview with involved teachers in each school (2 teachers in Marie Curie and 4 in Les Toupets) was also conducted to collect their impressions about the PW. **TRACES** supported **UAB** and **UOC** in the communication and logistics with the schools to conduct the assessment.

In the UK, during the first round of PW, observations were conducted both by **UOC** and **UoB** in the participant school (Fairfield High School) in February 2017 (Month 16). Following advice from **UoB** and **SMS**, only one PW was recorded. **SMS** conducted the observations of students' performances in March 2017 (Month 17) and sent the notes to **UAB** in June 2017 (Month 20). In

May 2017 (Month 19) **UOC**, supported by **SMS** and **UoB,** conducted a 1-hour focus group with 8 students. 19 participant students and 13 who were not involved in PW answered to pre- and post- surveys. An online survey was also sent by email to the 2 participating teachers. The online format was considered more appropriate to provide critical feedback than a face-to-face interview, due to the cultural setting. For the ECRs interview, **UOC** and **UAB** used the transcripts from the reflection session conducted by **UoB** with 7 ECRs (see also Task 3.2), as the data collected already addressed students' acquisition of transversal competences.

In Spain, **UAB** and **UOC** continued with the observations at the two participant schools, which began in January 2017 (Month 15), by following the structured observation guide and the audio-visual recording guidelines. **UAB** and **UOC** researchers also observed students' final performance in both schools and recorded their notes according to the observation guide. Between April and May 2017 (Months 18 and 19) **UAB** and **UOC** conducted a 1.30-hour focus group with 10 students in INS Santa Eulàlia and 7 students in IES Castellbisbal. Further, at the INS Santa Eulàlia **UAB** and **UOC** also designed and implemented a 1-hour pilot reflective session with all the participating students, which was oriented towards enhancing learning to learn skills, such as fostering reflective thinking about their learning process. Pre- and post-surveys were answered by 37 and 22 participant students in INS Santa Eulàlia and IES Castellbisbal, respectively, and 16 and 18 students from control groups. **UAB** and **UOC** also conducted a 1-hour group interview with involved teachers to collect their impressions about the project and the impact on the school students (10 teachers in INS Santa Eulàlia and 3 teachers in IES Castellbisbal). In the case of INS Santa Eulàlia one of the two teachers directly participating in the workshops also answered to some questions via online to add more information to the group interview. **UAB** and **UOC** also conducted a group interview with 3 ECRs in May 2017 (Month 19), which was jointly prepared and implemented with **UoB** (see also Task 3.2). 4 ECR answered an on-line survey.

Starting in January 2017 (Month 15) **UAB** and **UOC** organised weekly on-line meetings to ensure coherence in data collection and analysis across case studies. From March to July 2017 (Months 17 to 21), **UAB** and **UOC** analysed all the data collected. In all cases, **UAB** and **UOC** collected observations using a Word file for the complete set of notes (narrative) and systematised them in an Excel template. Observations were qualitatively analysed to explore in-depth the pedagogical context and learning approach and to which extent and how it fostered the *mise-en-place* of skills and competences implied in the creation of the students' performances. Surveys were systematised in Excel templates and quantitatively analysed through a statistical software. Students' answers for the pre- and post-surveys were analysed by looking at the percentage of answers reported by students. Answers were then compared with those from the control group, and differences between boys and girls were analysed. The variation of every individual answer for each question was also calculated to see whether students' answers changed their answers between pre- and post-surveys. All these results were complemented with students' inputs further collected through the focus group transcripts and learning charts. Finally, to complete the analysis, **UAB** and **UOC** qualitatively analysed teachers' and ECR's perceptions about the fostering of students' transversal skills through the process gathered through the oral and written interviews. All data were anonymised following PERFORM ethical standards set in Deliverable 7.1.

As a result, **four internal reports were generated in each case study**. Each of the documents extensively reported the data collected through all the assessment tools and provided an analysis focused on the goals identified for the development of the participatory educational process. Those results of the analysis corresponding to transversal competences were compiled in one internal research report, i.e., promoting the acquisition of transversal skills amongst students. As a way to explore how the participatory educational process approached this goal, the focus was set on **three different types of transversal competences**: i) learning to learn skills, ii) civic and social skills, iii) sense of initiative and entrepreneurship. More specifically, the analysis was oriented towards exploring to which extent PW facilitated learning spaces to train and put in practice students' transversal competences, and what aspects facilitated or hindered

such practice. **UAB** shared analysis reports with case study coordinators in June and July 2017 (Months 20 and 21) and feedback meetings were held between **UAB, UOC** and **TBVT, SMS** and **TRACES** between this month and September 2017 (Month 23) to discuss the results and their main implications for PW redesign. The analysis was presented emphasising strengths of the process and aspects to improve, according to the different data inputs. Highlights from the analysis and related recommendations were also identified in the three case studies and shared with case study coordinators, in order to contribute to the redesign process in the second implementation round. Between September and October 2017 (Months 23 and 24), these results were processed by **UAB** and **UOC** to be returned to PERFORM participants in a summarised and accessible way. One short report containing main messages addressed to different stakeholders (students, teachers, researchers) were generated in the local language of each case study as an output for this return of results and are available at the PERFORM webpage. Also, short videos will be produced by **EUSEA** through graphic animations that will highlight the key messages defined by **UAB** and **UOC**.

Also in September 2017, **UAB** supported by **UOC** started to work on the **redesign and refinement of the assessment strategy and tools to be implemented during the second round of PW.** Such redesign incorporated the learning and insights gathered during the first implementation round and the feedback provided by the AB in August 2017 (Month 22). For that purpose, **UAB** and **UOC** focused on the redesign of the survey, the systematic observation guide and the formative evaluation, by working around two main aspects. First, a better grounding of assessment indicators related to transversal competences in the specific design of the PW, e.g. by tailoring the three categories of skills identified in the assessment framework to the pedagogical approach of PERFORM and the skills put in practice by students during PW. Second, the presence of the formative evaluation to enhance students' self-reflection about their learning process (e.g. learning to learn skills, RRI values). A detailed protocol with these changes was shared with **SMS** in Bristol, **TRACES** in Paris and **TBVT** in Barcelona in November 2017 (Month 25) and a Skype or face-to-face meeting was held with them between Month 25 and 27 to discuss its implementation. This way, **SMS, TRACES** and **TBVT** provided feedback about any potential local adaptations and suggestions in the design.

It was agreed to integrate the **formative evaluation** in the design of the PWs, as part of students' learning and creation process. In doing this, new activities were integrated within the PW, which were focused on: i) students' perceptions of science and researchers (including researchers' skills), and ii) students' awareness of the learning environment created through PERFORM and their emotions within this learning environment. For that purpose, the formative assessment combined two kinds of activities to be implemented by the science communicators in each case study: one individual written activity and one group activity applying body movement. The new formative evaluation design also included a final reflective session with the students once the PWs were over, in order to reflect with them about their answers to the formative evaluation activities (see below).

The revised version of the pre- and post-survey included new items on transversal skills, such as items on reflective and critical thinking, learning autonomy and communication skills. The observation guide was reorganized and some indicators were merged to facilitate its implementation, while some others related to transversal competences were emphasized (i.e., students' learning autonomy).

These three tools (students' surveys, observation guide and formative evaluation) were ready and tested (in case of students' surveys) by **UAB** and **UOC** in December 2017 and January 2018 (Months 26-27), before the beginning of the second round of PW.

UAB and **UOC** coordinated the **implementation of the assessment methods in the 7 schools participating in the second round of workshops**. In January 2018 (Month 27) **UAB** and **UOC** researchers held a two-day meeting in Barcelona to discuss in-depth the assessment implementation and approach specific implementation needs in each case study. Later on, Skype

weekly meetings took place to facilitate communication, share insights and face specific implementation issues, ensuring coherence across the implementation in the different case studies as well as responsiveness to each local context.

From January 2018 until the moment of this reporting (April 2018, Month 30), **UAB** and **UOC** implemented the surveys and observation guide in the 5 participant schools in Bristol and Barcelona (to 18 participant students in INS Consell de Cent, 19 in IES Moisès Broggi, 18 in Bridge Learning Campus, 15 in Castle School and 8 in Bristol Free, and similar numbers in the control groups). In the case of France, in which the workshops are still taking place, only the observation and the survey pre-PERSEIA have been implemented (to 18 participant students in Villiers and 19 in Montreuil). Likewise, **SMS, TRACES** and **TBVT** implemented in each corresponding case study the formative evaluation activities during PWs.

In February 2018 (Month 28) **UAB** and **UOC** implemented the reflective session with all students involved in the PW in the UK and Spain in order to explore with them and consciously ground their learning through the project. Most specifically, students discussed about: i) their awareness of the learning environment created through PERFORM, by reflecting about the perceived differences with their traditional learning environment at science class, the skills trained and their reactions to the methodological approach, ii) the different goals of the PERFORM project (including training transversal competences and skills) and to what extent they considered they had been achieved and why.

Formative evaluation exercise at IES Broggi, Spain: identifying PERFORM main characteristics as a learning approach

Formative evaluation exercise at INS Consell de Cent: students assessing PERFORM's achievement of learning goals

Based on the data from this session, the surveys and observations, a new design of focus groups with selected students was tailored for each specific case study, to further explore relevant aspects of students' perceptions of the participatory educational process and its impact in students' transversal competences, among others. For that purpose, **UAB** and **UOC** implemented one focus group with 6-8 students in each school in Barcelona (Month 29) and the UK (Month 30).

Finally, the group interview guides for teachers and ECRs were reviewed during April 2018 (Month 30). The teachers' interview was implemented during the same month in Bristol and Barcelona with 2 teachers in each school. It included questions about the impact of the project in students' training of transversal competences, according to their impressions and their knowledge of the students. A group interview with 7 ECR was implemented in Barcelona in Month 30 and it included inputs from **UoB**. In the case of Bristol, **UAB** will use **UoB** reflection session with ECRs (to take place in Month 31, see also Task 3.2), providing inputs where needed.

Task 4.4 Assessment of the Responsible Research and Innovation values

RRI values within the PW were mainly explored by **UAB** supported by **UOC** through students' inputs provided in the surveys (as a first quantitative approach) and observations of the PW complemented by students, teachers and ECRs inputs through focus groups and interviews (as a qualitative in-depth approach) during the first and second round of PW in 2017 and 2018.

For that purpose, during the first round of PW, and complementing the assessment described in Task 4.3., between January and May 2017 (Months 15 and 19) **UAB** supported by **UOC** implemented the pre- and post-survey with participant students in PW activities and those from the control group (as reported in the first reporting period). The objective was twofold: i) to

compare students' attitudes and perceptions towards science and STEM careers, with an emphasis on RRI-related dimensions (gender stereotypes, ethical issues, inclusiveness, engagement and critical/creative thinking), before and after the implementation of PWs, and ii) to examine students' perceptions towards the participatory educational process, also as an input to inform the design of the focus groups. In order to evaluate whether students' answers were specific to the PERFORM group, **UAB** and **UOC** also conducted these questionnaires (pre- and post-surveys) among a group of students who did not attend to the workshops: the control group.

The post-surveys were delivered once the PW were finished, in specific time-slots scheduled for the occasion: during March 2017 (Month 17) in Barcelona, April 2017 (Month 18) in Bristol, and May and June 2017 (Months 19 and 20) in Paris; with one exception: for IES Castellbisbal (Barcelona), it was delivered just after the performance of the scientific monologues, due to difficulties in finding an extra time slot with students. Surveys were answered by participant students and by the control group in each school, from which parental informed consent was obtained. In the UK, **SMS** arranged the implementation dates of the survey in Fairfield High School and managed the informed consent for the control group. In Spain, **TBVT** collected the informed consents of the control group in Castellbisbal secondary school and supported the **UAB** team in the collection of informed consents in Terrassa. In Paris, **UOC** supported by **TRACES** conducted these surveys.

From March to July 2017 (Months 17 to 21), **UAB** and **UOC** analysed all the data related to RRI values and collected through observations, written surveys and learning charts, focus groups and group interviews. As in the case of Task 4.3., such analysis was reported in **one internal research report** for each case study, which focused on including RRI values in the participatory learning process and boosting motivations towards science. As a way to explore how the workshops approached this goal, the report focused on **three different aspects of RRI values**: i) inclusiveness, ii) engagement, and iii) ethics integration. In another internal research report, **UAB** and **UOC** also analysed students' general perceptions and attitudes towards science before and after the PW in order to contextualize the analysis and identify potential changes resulting from students' participation. Gender was included as a variable of analysis along all these aspects.

Pre- and post- surveys explored students' perceptions and attitudes towards science around several RRI-related dimensions, such as: students' feelings on science learning at school, motivations towards studying a scientific career, personal value of science learning, perceptions of gender-related roles in science or understanding of the nature of science. Students' answers to the survey were further explored through the learning charts and the focus groups conducted. Furthermore, in order to explore if and how the pedagogical context and related factors of the PW had integrated RRI process requirements and fostered learning outcomes, **UAB** analysed the transcription of the observations during the whole process. For the analysis of inclusiveness, observations mostly focused on the implementation of the designed activities and their facilitation (to identify process requirements) and on students' performance and participation throughout the PW. Students' cognitive engagement in the PW was approached mainly through observations focused on the capacity of the learning process to foster students' questioning and reframing, systems thinking, the connection of topics with experience, and the consideration of different perspectives and points of view in their discourse. Data on emotional aspects of learning was also collected and analysed by **UAB** and **UOC**, such as students' enjoyment and affective reactions towards the topics approached and methods proposed. Finally, ethics integration was analysed through the observation of different process requirements during the implementation and facilitation of the PW. To complete such analysis, both involved teachers' and ECRs' perceptions of the educational process implemented were explored.

As with Task 4.3, the analysis reports corresponding to RRI values were shared by **UAB** and **UOC** with **TBVT, SMS** and **TRACES** in June and July 2017 (Months 20 and 21) and feedback meetings

were held between July and September 2017 (Month 23) to discuss the results and their main implications for the redesign of the PW (see also Task 2.2).

During September and October 2017 (Months 23 and 24), the **UAB** supported by **UOC**, started to work on the **redesign and refinement of the RRI values assessment strategy and tools** to be implemented during the second round of PW. Such redesign paid attention to the exploration of the RRI values embedded within PW scientific content shared with students, which is a core and challenging aspect of the project. Furthermore, **UAB** and **UOC** worked to enrich and further expand the analysis framework in relation to gender, through the adoption of an intersectional approach in the assessment strategy.

As a result of this process, the assessment tools (i.e. observation guide and students' surveys) were refined, adapted to each case study and implemented by **UAB** and **UOC** before, during and after **the second round of PW** since January 2018 (Month 27). The improved version of the pre- and post- surveys included new items on students' educational aspirations (including their parents' expectations), science identity, critical thinking and changes in science perceptions. Items on students' educational aspirations and science identity also contributed to approach gender from an intersectional perspective. The observation guide emphasized as well some indicators related to RRI, such as facilitators' discourse of science (i.e. how science is presented to students through the project), beyond indicators on process requirements.

The new formative evaluation strategy (see above, Task 4.3) focused as well on students' processes of meaning making (i.e., how students make sense of the contents approached), in order to reflect with them about RRI dimensions introduced through the participatory educational process. For that purpose, students were invited to reflect, both at the beginning and at the end of the workshops about relevant aspects of science (i.e. what is needed to conduct scientific research) and about any new insights or learning about science and research through the project (e.g., the different creative and RRI elements of the approach related to the human dimension of science, exploring scientific topics through a creative process).

Focus groups (see also Task 4.3), in turn, helped to explore the impact of PERFORM RRI approach in students' attitudes towards science and STEM and pro-scientific behaviours. These included the exploration of: i) specific changes in students' perceptions, according to their answers to specific items in the pre- and post- surveys and their open answers to the post-surveys; ii) students' scientific career choice (e.g. how and when they make that choice, elements influencing such choice, potential impact of projects like PERFORM); iii) students' identification with science and scientific careers. As mentioned above, so far, the focus groups have been implemented in the schools of Barcelona (Month 29) and Bristol (Month 30) by **UAB** and **UOC**. In the UK, **UoB** informally supported **UAB** and **UOC** in facilitating and taking notes in these discussions.

Finally, the teachers' interview implemented by **UAB** and **UOC** in Month 30 with participant teachers in the UK and Spain included questions on students' engagement through the process, teachers' perceptions about the added value of PERFORM's RRI, about the creative approach in students' attitudes towards science, and about their consideration regarding their role as teachers through the process. Teachers' opinions and attitudes related to learning resources fed in to Task 3.3. Besides, ECR group interview included questions about ECRs role through the project, their interactions with students and their approach to RRI elements through such interactions.

1.2.5 Work Package 5 (WP5): Sustainability and Policy Impact [Months 1-36]

During the reported period, **UNESCO**, as the WP5 leader, led work to promote and advocate for PERFORM to make it more visible and known by both policy-makers and science education and communication practitioners. This was done by attending and organizing dedicated PERFORM sessions during high-level events in the field of science communication and science education

including World Science Forum 2018 and the Public Communication of Science and Technology Conference 2018 (PCST).

The last **UNESCO** General Conference gathering Ministers of science technology and education from all the 195 **UNESCO** member states was also an excellent opportunity to connect with science education policy-makers and advocate for PERFORM and the importance of developing and investing in non-conventional means to learn and teach science to engage young girls and boys in the STEM.

In line with the External review meeting recommendation, a second relevant goal of this period was to pursue the resource mobilization efforts at national and regional levels this, to ensure the project sustainability beyond the current funding. To achieve this aim, **UNESCO** organized a series of separate meetings with representatives of its Member states divided into six different regional groups. The goal of the above-mentioned meetings was to promote and advocate for the concept of "myPERFORM" as expansion and adaptation of PERFORM outside the three current pilot countries.

Finally, **UNESCO** together with **EUSEA** and **UOC** kept working on the organization of the forthcoming PERFORM final conference.

Task 5.1 Generation of a sustainability plan

This task ended up in January 2017 (Month 15) with the submission of the Deliverable D5.1 Sustainability plan. Nevertheless, **UNESCO** continued work in this line since an essential element for the success of the PERFORM project after the end of the EU funding is the firm links and interactions between PERFORM and the academia.

In April 24th, 2017 (Month 18), **UNESCO** led a presentation of the PERFORM sustainability plan that was made during the EC external review meeting hosted by **UOC** in Barcelona. On this occasion, the concept of "myPERFORM" was shared and discussed with the whole consortium and with the EC Project Officer and the external reviewer, who made suggestions to rethink the concept so as to ensure its sustainability in the long term. As a follow-up of the review meeting with the Project Officer and the External reviewer and the PERFORM Advisory Board recommendations from Deliverable 1.3 (see Task 1.3), **UNESCO** kept on working on the promotion of "myPERFORM" concept during this reporting period.

In this regard, smaller-scale and specific projects were designed for various countries interested in implementing and adapting PERFORM. As of this reporting period, the list of dedicated "myPERFORM" project at national or regional level includes seven African selected countries, China, Jordan, Kazakhstan, and Yemen. Moreover, as far as fundraising and sustainability of PERFORM is concerned, **TBVT** was in contact with Chinese representatives to discuss the possibility of developing a PERFORM pilot project in China. In January 2018 (Month 27), in this vein, a teleconference was held with the National Director for the El Hassan Youth Award to discuss possible ways to implement "myPERFORM" in Jordan. **UNESCO** was also in touch with representatives of Ukraine, Kazakhstan and Egypt.

In April 2018 (Month 30), **UNESCO** run two presentation meetings about PERFORM with Ambassadors and Permanent delegates of the African and Asian group of **UNESCO**. The objectives of these two meetings were to present the advancements of the PERFORM project and to show to these Member State representatives how PERFORM is a great tool to share the human side of research and therefore to engage young girls and boys in future scientific careers. The meetings with the other groups including Europe and North America group will be held in May/early June 2018. More information will be provided in the next report.

UNESCO also worked on several communication tools and a synthesis communication material about "myPERFORM".

Task 5.2 Maximize the policy impact of PERFORM

As part of its duty in maximizing the policy impact of PERFORM, **UNESCO** shared with the consortium (April 2017, Month 18) the latest UNESCO analytical policy tools and indicators. The information shared with the consortium aimed at providing the necessary tools and literature in order to conceive the most effective toolkits for students and teachers.

The folder shared was divided in 4 subfolders.

1. STEM Education in UNESCO, presents UNESCO vision and strategies to engage young people into STEM.

2. Series of Books & Publications, focusing on the latest research findings studies in the field of Science Education.

3. Statistics & Policy, gathering figures and numbers on the status of science and Science Technology and Innovation (STI) in the world including Europe.

4. Gender, Girls & Women in Sciences, focusing on gender issues and ongoing initiatives to engage girls and women in science.

Furthermore, in October 2017 (Month 24), **UNESCO** took advantage of internal major events including the 202nd UNESCO Executive Board (58 countries) and the 39th UNESCO General Conference (195 countries) to advocate and communicate on the benefits of the PERFORM project in engaging young schoolchildren in STEAM. **UNESCO**'s lobbying actions targeted the UNESCO's Member states and especially the representatives of their Ministries of Education (MoE) who attended the above-mentioned major internal events.

In addition to the above, during the reported period **UNESCO** advocated for PERFORM in other significant events at international level in the field of science education and communication:

- November 7th-11th, 2017 (Month 25): On the occasion of the **UNESCO 39th General Conference**, PERFORM was presented to the Minister of Education of Uruguay. A similar discussion about the project was also made with representatives of Cuba, Gabon, Ukraine, and Russia. In parallel to the UNESCO General Conference, PERFORM was also presented to policymakers and science education specialists during the **World Science Forum** that was held in Jordan. The PERFORM session at World Science Forum was run in cooperation with **UOC** and **SMS**.

- December 5th, 2017 (Month 26): **UNESCO** together with **UOC**, Scientix, and GEDII a sister H2020 project, organized the **12th Scientix Projects' Networking Event on 'Gender and innovation in STE(A)M education'** focused on gender issues in STEM education. Thirty-five participants attended the workshop in Brussels including PERFORM Project Officer, other Horizon 2020 sister projects, academia and teachers from all around Europe. **UAB** and **UoB** also took part in the one-day workshop. The goal of the workshop was to share experiences and initiatives addressing gender aspects in science education in innovative ways. Therefore, it was an excellent opportunity to reflect upon the role of arts-based approaches for combating gender stereotypes and bias within science and beyond. Two **UNESCO** Experts from Gender Equality department presented the critical challenges on gender issues in the STEM. While the first expert provided the **UNESCO** response to tackles these issues using art and Performance art, the second one invited the audience - divided into small working groups, to reflect and identify best practices to overcome the current gender gap in STEM education. Three set of questions were proposed to the public to this end: 1) Identify the three greatest challenges you have faced in introducing arts into science education; 2) What kind of support would be helpful in overcoming such obstacles?; 3) How can arts help dealing with stereotypes in STEM education? What is the added value of arts in this regard, if it has some? The conclusions of the workshop mentioned above will be inserted in one of the forthcoming policy briefs in Deliverable 5.2.

12th Scientix Projects' Networking Event, Brussels, December 2017

- April 4th-7th, 2018 (Month 30): The **Public Communication of Science and Technology Conference 2018 (PCST)** was held in Dunedin, New Zealand. PERFORM was there represented by **UNESCO**, **UOC**, **TBVT** and **UoW**. Highlighting **UNESCO** and **UOC** presentation of PERFORM as a perfect example of "New approach to science communication". The goal of this session was to share the progress of the PERFORM project and its impact on policy-making in science education. The session was a success and raised the interest of several participants in the project. Moreover, a number of networking opportunities originated at the conference. Attendees heard from the Chief Science Advisor to the Prime Minister of New Zealand, a NASA representative, and a number of distinguished scientists and science communicators. On behalf of the consortium, **UNESCO** agreed to explore new ways of collaboration with Dr. Theodore Anagnostopoulos from SCICO, a non-profit organisation for science communication, and Sofía Otero Cavada, Outreach Officer at CEGA, the Andean Geothermal centre of Excellence.

Finally, during the reported period, **UNESCO** and **EUSEA** kept on working on the organization of the PERFORM project Conference to be held in June 2018 at **UNESCO** Headquarters. The program and budget of the event have been refined and adapted in coordination with **UOC**. In cooperation with **EUSEA** and **UOC** also work on: a two-page flyer and an electronic banner of PERFORM that will be uploaded at the PERFORM website. The goal of these tools was to support common efforts in advocating and lobbying actions in promoting PERFORM during big events related to STEM, arts and science communication.

1.2.6 Work Package 6 (WP6): Dissemination and Outreach [Months 1-36]

A constant and increasing effort to produce communication materials to enhance the impact of the messages generated by the project and its results was developed collectively and coordinated by **EUSEA**, as WP6 leader.

The dissemination and communication of the project progressed during this period together with the relevant goals of the first period (i.e. broaden the consortium connections with other networks such as ECSITE, European Researchers' Night, and EC Open Day organizers as well as the Beijing Association for Science and Technology at continental and global level).

Moreover, as stated in Task 5.2, the initial actions to organize the final conference of the project were taken by **EUSEA** and **UNESCO.** The consortium strengthened this action to consolidate and broaden the international network of relations with different stakeholders.

In sum, during the reported period efforts and actions were developed to enhance the dissemination and outreach impact along three lines:

- The Online actions through social media and publication of articles in the newsletters of different communities of interest.
- The participation into national and international meetings in order to broaden the community of stakeholders interested and connected with the project.
- The development of the Perform Conference structure, content and the dissemination of information about this conference both offline and online.

Task 6.1 Communication Plan and Tools

As for the communication plan implementation and development, based on the target audiences identified in the communication plan developed by **EUSEA** (D6.1 Plan for communication, dissemination and exploitation) a set of actions were developed during the reported period, and the production of specific communication materials was promoted together with a collaborative use of PERFORM social media (namely Twitter and Facebook) that led to the following results:

- **Production of 13 videos** that together with the 8 produced in the first period sum up to 21 videos available on the PERFORM YouTube channel describing some of the main features of the project and some of its preliminary results. Videos were produced by **SMS**, **UOC** and **TBVT** based on the suggested editorial guidelines and objectives identified and discussed jointly with **EUSEA**:

  - 1 video developed by **SMS** in February 2017 (Month 16) shows an example of trainings with students.

  - 1 video developed by **UOC** in April 2017 (Month 19) present the talk delivered by UOC colleague Karla Berrens on May 31st, 2017 in Barcelona and awarded with the title of the best presentation in the event organized by **UOC**.

  - 11 videos produced by **TBVT** between May and September 2017 (in Months 19 - 23) to explain the main features of the exploratory workshops conducted with the students to generate the expert PERSEIAs. These videos are part of the **user-friendly version of the Deliverable 2.1**., for which **TBVT** designed a strategy for the promotion and dissemination of these through the TBVT Social Networks Facebook, Twitter, Webpage and Blog. The deliverable is also available at the PERFORM website under the Toolkit section for teachers, but also suggested for researchers. The videos introduce the workshops structure and guidelines, which are downloadable from the PERFORM website. The 11 videos were published in the **TBVT** social networks, one per day, linking to the complete document in the Perform Web Page. One blog entry has been published in the **TBVT** blog and one MailChimp e-mail entry have been designed and sent to the TBVT e-mail base data contacts (more than 5000 contacts). **TBVT** also recorded video messages and audio tracks collecting *vox pop* from students in IES Castellbisbal and early career researchers. Since the material collected in these cases is

in raw format its contents will be used for further edited videos concerning the results of the project).

Additionally, during the reported period some of the videos produced in the previous period (M1-M15) were edited:

- 4 videos produced by **TRACES** and **LAC** which show excerpts of the clownery approach to the PERSEIAs development (edited in February 2017, Month 16): The Video are now available with PERFORM Youtube subtitles in English.
    - https://www.youtube.com/watch?v=G-enLa6cYYM
    - https://www.youtube.com/watch?v=R9a8oWA6vFc
    - https://www.youtube.com/watch?v=-3ERyZ2-R6A
    - https://www.youtube.com/watch?v=T9QJnlVbzcI

- 1 video developed by **UOC** describing the data management in the open source library approach (edited in April and May 2017, Months 18 and 19)

- The PERFORM Twitter and Facebook accounts were directly curated by **EUSEA**, who also promoted a collective use by the consortium members developing and distributing guidelines for social media use. Currently **in April 2018 (Month 30) PERFORM has considerably increased the number of followers in Twitter (433)** and **likes on Facebook (671)** comparing to the first reporting period. Particularly, PERFORM social media are increasingly used to promote the PERFORM conference contents together with other contents related to: RRI, STEM (among the other the STEM Discovery Week held in April 2018 was promoted through the Online PERFOMR media) and Science Communication at large.

- Launch of the **first PERFORM newsletter** in March 2017 (Month 17). **EUSEA** developed editorial actions defining the structure and topics of the newsletter jointly with **UOC**, assigning the articles to **TBVT, SMS, Traces, AJA, UAB, UoB, UOC, UoW** and **UNESCO** who wrote them, editing the articles and disseminating the newsletter through the web-platform. All the partners took part in the writing process of the newsletter focusing on specific topics related to their role and tasks within the project.

- Launch of the **second PERFORM newsletter** in January 2018 (Month 27). **EUSEA** developed editorial actions and prepared the 6 articles taking into account the information collected by all the partners and the data presented both in the internal report and in the deliverables. The newsletter was disseminated through the standard PERFORM project mailing list and with the support of the **EUSEA** network mailing list.

- PERFORM featured in the **Scientix Newsletter** – February 2018 (Month 28) Issues dedicated to "Girls in STEM". The article was connected to the contents discussed by the PERFORM team (**UNESCO** and **UOC**) during a networking event organised by Scientix in December 2017 about gender and innovation in STE(A)M education, in collaboration with the EU funded GEDII projects.

- PERFORM featured in the **EUSEA** periodical newsletter trough two articles: one in December 2017 (Month 26) and the other one in March 2018 (Month 29). The two articles focused on the main results of the project and on the announcement of the PERFORM Conference respectively.

- **TBVT** promoted the use of WhatsApp tool to create group of students and ECR discussing common issues related to the experience they have had together during PW. The use of this tool is under analysis to understand its real impact. The tool was fostered following the suggestions of the external review meeting with the EC.

- **UoW** and **UOC** produced and communicated Twitter content about the project, including during the PCST 2018 conference, and re-tweeted content from the project feed.

- **UOC** released a communication campaign by means of videos with the PERFORM coordinator interviewed in Barcelona (Spain) in February 2018 (Month 28).

Task 6.2 Building the community relations and outreach

During this reporting period **42 main outreach events** (29 international and 13 national) were attended by **UOC, UAB, UoB, UoW, TBVT, TRACES, SMS, UNESCO**, 3 of which directly by **EUSEA**, who worked on submitting proposal, organizing and convening sessions on some of the main European science engagement conferences in Brussels, Leuven and Porto in May/June 2017 (Months 19 and 20). The outreach events where selected and attended to reach the target audiences previously identified by EUSEA in D6.1 both at national level (countries where the consortium partners are based) and at European level. Moreover, networking activities were developed during the last months of this period by **UNESCO, UOC, TBVT, UoW** and **EUSEA** that led respectively to the presence of the PERFORM project into several international relevant contexts on science education and communication (see also Task 5.2).

Listed from the oldest one, the outreach events attended by PERFORM partners during this period are briefly described below (a full list of the event is published on the PERFORM website events section):

- 2017, April 23rd, II Neuroeducation International Seminar, Girona (Spain). **TBVT** presented PERFORM preliminary results and gave a short talk about the relationship of education and emotions in the context of PERFORM project.

- 2017, May 3rd, European Researchers' Night Coordinators' Day, Brussels (Belgium). **EUSEA** presented the training opportunities for early career researchers under development in the PERFORM project during the session at Directorate-General for Education, Youth, Sport and Culture.

- 2017, May 6th, European Commission Open Day, Brussels (Belgium). PERFORM was selected by the EC as one of the 15 participating projects and invited to attend the event in May 5th, 2018 (Month 31). **SMS** and **UOC** presented the busking activities and the format for innovation in STEM education developed by the PERFORM project.

- 2017, May 16th, 2nd Homo scientificus europaeus Meeting, Barcelona (Spain). During the session on RRI and participative science **TBVT** presented the PERFORM project achievements.

- 2017, May 29th-30th, EUSEA Annual Conference, Leuven (Belgium). **EUSEA** and **SMS** developed a workshop to present the PERFORM project and experience the meaning of participation in the development of STEM-based performances. The workshop included stakeholders from the science communication field from all over Europe.

- 2017, May 31st, **UOC** open day, Barcelona (Spain). A presentation in a TED talk style of the PERFORM contents and structure to the **UOC** Research Showcase was delivered by **UOC.** The presentation was awarded the first prize. Participation of **UOC** as speaker in a panel session on Open Data.

- 2017, June 27th, PESO (Public Engagement with Science Online)-A Research Workshop of the Israel Science Foundation, Haifa (Israel). **UoW** presented the preliminary results of

the evaluation of the social media-based impacts of the performance events on young people's engagement in science.

- 2017, June 16th, ECSITE Annual Conference, Porto (Portugal). A session with the title RRI: new collaborations for science communicators and researchers was developed and held by **EUSEA, SMS** and **UOC.**

- 2017, July 8th, V International meeting SRUK (Society of Spanish Researchers in the United Kingdom), London (UK). **TBVT** took part into a roundtable on science engagement and presented a monologue titled Brain and epigenetics.

- 2017, July 11th, International University Menéndez Pelayo, 'The challenge of science: a look at international assessments', La Coruña (Spain). **TBVT** presented the PERFORM Project D2.1 related outcomes.

- 2017, July 19th-21st, The Big Event, Newcastle-Upon-Tyne (UK). **SMS** presented excerpts from busking sets developed during the PERFORM project to professionals in science communication. The goal was to enhance the participatory approach of new science busking activities under development in the PERFORM project.

- 2017, August 25th-28th, Shanghai International Popular Science Products Expo 2017, Shanghai (China). **SMS** presented the PERFORM project preliminary results and outcomes during the event jointly organized with **EUSEA**.

- 2017, September 22nd, Barcelona Peptide Therapeutics Symposium 2017. International symposium where **TBVT** presented the PERFORM Project to the audience, with a high proportion of ECRs, with the possibility of joining PERFORM Task 2.2.

- 2017, September 26th-27th, Science is Wonder-ful, Brussels (Belgium) and 29th September, Paris (France), Valladolid and Madrid (Spain) European Researchers' Night. **SMS, TBVT** and **TRACES** were all involved in the development of shows and activities in different locations where the European Researchers' Night was held.

- 2017, October 2nd-4th, LabSchoolNetwork, Paris (France). **UAB** and **UOC** participated in the conference titled "Colloque Le Bien-être dans l'éducation to introduce a reflection on the potential of arts-based methods for inclusive science education.

- 2017, November 2nd-3rd, Belgrade (Serbia). The **AJA** team delivered a training for science communicators also based on the participatory methods developed and studied in the PERFORM project. The event had a national dimension. The main stakeholders involved were young researchers and communicators.

- 2017, November 7th-11th, World Science Forum, Dead Sea (Jordan). **UNESCO, SMS** and **UOC** took part into the event presenting a session on the innovation in education through the performing art as experienced in the PERFORM project. The context allowed to present the PERFORM results to policy makers and scientists from all over the world and to start promoting the PERFORM Conference. The event is relevant to enhance the visibility of the project among policy makers, scientists and communicators.

- 2017, November 8th-10th, Foz doIguacu (Brazil). **UoW** delivered a plenary presentation and workshop at the 1º Simpósio Internacional de Conservação Integrada that included methodological know-how and example findings from the impact assessment work package of PERFORM. The audience for these activities included approximately 350 practitioners and policymakers, primarily from Brazil.

- 2017, November 15th-17th, Beyond the Obvious Conference, Rome (Italy). **EUSEA** and **SMS** took part into this international event dedicated to cultural strategies in Europe which is organised every year by the Culture Action Europe Association, a network of artists and professionals in the field of culture. **SMS** presented example of innovation in science education among which the PERFORM project features and outcomes. European cultural stakeholders were the majority of the participants involved in the conference. The event was relevant to increase the interdisciplinary connection of the project with performers and other artists or cultural stakeholders that are interested in the results of the PERFORM project.

- 2017, November 18th-19th, Educere Network Meeting, Oxford (UK). **UOC** and **UAB** took part into the Inaugural event of this network, an international event gathering scholars, practitioners and policy-makers working in the fields of education, wellbeing and environmental sustainability from the Educere and Educare Network (Oxford Department of International Development, University of Oxford). The PERFORM approach was presented in the event through the implementation of a workshop.

- 2017, November 23rd-24th, Congreso de Comunicación Social de la Ciencia, Cordoba (Spain). **UOC, UoB, AJA** and **UAB** took part into the VI Congress of Social Communication of Science delivering a presentation focused on the key aspects of the PERFORM training to early career researchers and the particular experience in Barcelona.

- 2017, November 29th-30th, II Jornadas #RSU: Un diseño universitario para la responsabilidad social¨, Castelló (Spain). **UOC** presented an oral talk entitled ¨Bridging the gap between RRI theory and practice" at this event in which the online training course for ECR resulting from PERFORM project was advertised.

- 2017, December 5th, 12th Scientix Projects' Networking Event (SPNE12), Brussels (Belgium). **UNESCO** and **UOC** together with Scientix coordinated the organisation of this event with Scientix, a one-day meeting with projects members involved in innovation in education processes and EU funded projects. The workshop was focused on Gender and Innovation in STE(A)M Education. **UAB** and **UoB** participated as well in the workshop.

- 2017, December 6th-7th, Engage Conference, Bristol (UK). **UoB** took part in a panel discussion on innovation in STEM sharing the PERFORM approaches. The conference session was entitled: 'tackling engagement challenges'.

- 2017, December 7th, SCI:COM conference, Dublin (Ireland) **EUSEA** participated in this conference about science communication in Ireland taking part into a panel discussion were examples of EU funded projects on innovation in science communication were presented among which the PERFORM project.

- 2017, December 13th, European Researchers' Night info day 2017, Brussels (Belgium). **EUSEA** took part during which networking activities aimed at inviting science communicators and other stakeholders to the PERFORM Conference were implemented and the possible link between the PERFORM project and results and the Marie Curie Actions were investigated to be further developed.

- 2018, January 4th, Accessible Learning and Evaluation at the Exploratorium workshop, San Francisco (California). **UoW** contributed with an invited presentation was on designing impact evaluation of informal learning experiences in a way that accounts for diversity and accessibility, including examples from PERFORM impact assessment methodology.

- 2018, January 4th-5th, Association of Science Education (ASE) National Conference, Liverpool (UK). **UoB** representatives presented and delivered an interactive session on PERFORM at the. The **UoB** representatives gave the context for and presented some key objectives of the project and ran short workshop with activities from the teacher trainings including: RRI activities from Kilter and Big Van and requested feedback on teacher toolkit ideas.

- 2018, January 22nd-24th, Feria de proyectos de extensión y taller de evaluación de impacto at the Sede San Carlos at the Costa Rica Institute of Technology (Costa Rica). **UoW** participated in the with an invited keynote presentation on impact evaluation of public engagement with research and workshop on impact evaluation (both in Spanish), including findings and know-how developed through PERFORM.

- 2018, February 2nd, Parque Explora science centre, Medellin (Colombia). **UoW** delivered an invited presentation about impact evaluation of informal science learning, including know-how and example findings from PERFORM impact assessment.

- 2018, February 12th, Programa Argó Presentation Conference, Barcelona (Spain). **TBVT** made a live dissemination Performance at the Programa Argó, based on the PERSEIA developed in Task 2.1 and presented the Toolkit 2.1 in order to assist the students to prepare their reports, assisted by **UAB**.

- 2018, February 19th, Institut de Ciencies de l'Educació de la Universitat Autònoma de Barcelona, Barcelona (Spain). **TBVT** made a Dissemination performance to enrol teachers in the 2nd Teachers' Training to be held in July 2018.

- 2018, April 4th-6th, Public Communication of Science and Technology Conference 2018 (PCST), Dunedin (New Zealand). **UNESCO, UOC, UoW** and **TBVT** took part into the event that brings together academics and practitioners in science communication around the world so PERFORM took this opportunity to present preliminary results through oral communications, round tables with reflections on practice, and practical workshops and demonstrations.

- 2018, April 10th, RRI practice Consortium meeting at the University of Bristol, Bristol (UK). **UoB** presented Perform as a case study. The event reached 20 international attendees from different countries eg. Brazil, Sweden, Netherlands, Bulgaria, etc.

- 2018, April 12th, La Caixa d'Eines de l'Educació Ambiental al CCCB, Barcelona (Spain). **TBVT** showed PERFORM results through a performance, a talk and a round table with representatives of Educational Section of Diputació de Barcelona, Generalitat de Catalunya Government.

- 2018, April 17th, Swedish Research Council, (Sweden). **UoW** delivered a workshop on impact evaluation of science communication, including methodological know-how and examples from PERFORM impact assessment.

- 2018, April 18th, Forum for science communication, Gothenburg (Sweden). **UoW** delivered a workshop on impact evaluation of science communication, including methodological know-how and examples from PERFORM impact assessment.

- 2018, April 20th, the European Researchers Night Swedish Organisers Meeting, Gothenburg (Sweden). **UoW** delivered an invited presentation on impact evaluation of

public engagement events, including methodological know-how and examples from PERFORM impact assessment.

- 2018, April 25th, Bristol Doctoral College and Centres for Doctoral training meeting, Bristol (UK). **UoB** presented PERFORM in a talk titled Experiments in RRI training at this event that reached 20 people responsible for ECR training (and interested in introducing RRI training) at EPSRC CDTs.

- 2018, April 25th, Get Inspired by STEAM education! Webinar organised by the European Schoolnet, Online. **UOC** was invited to make a live and online conference entitled "Lessons from the PERFORM project as a practical example of STEAM" at this Webinar.

- 2018, April 26th. Freudenthal Institute, University of Utrecht, Utrecht, Netherlands. **UoW** delivered an Invited research seminar at focusing on research methods and findings from the assessment.

- 2018, April 27th. Higher Education Institutions and Responsible Research and Innovation (HEIRRI) second conference, Wien (Austria). **EUSEA** took part into this event on implementing new methods for training in Higher Education incorporating RRI Values. EUSEA presented the most updated results of the PERFORM project and the main topics of the PERFORM Conference planned for June 14th and 15th in Paris.

Regarding the actions developed to implement participation to future conferences, the **EUSEA** team jointly with **TBVT** designed and developed a Pre-conference session associated of the **EUSEA annual Conference 2018** in Madrid scheduled for the 17th and 18th of May 2018 (Month 31). The main objective of this pre-conference session is to share with the **EUSEA** community members the main results of the PERFORM project and to reflect on the PERFORM main methods on STEM education. The pre-conference opportunity will also be a context to present the PERFORM conference topics and structure in order to involve the **EUSEA** community at large. In addition**, UoW** has prepared content and logistics to contribute to the **EUSEA** conference based on PERFORM methodology and findings, both with a workshop and a plenary presentation. Moreover, during the reporting period the proposal to take part in the session about RRI focused project during the **ECSITE annual Conference 2018** in Geneva in the beginning of June 2018 was accepted (Month 32). The ECSITE conference will be an opportunity to share with the International Science Museum Community some preliminary results on the adaptation of the PERFORM methods to Science Museums contexts.

Finally, **EUSEA** and **UNESCO** started with the actions related to the organisation of the PERFORM final conference. In November 2017 (Month 25) the conference webpage was launched on the PERFORM website. Next, a series of actions were implemented to start promoting the conference in the context of the national and international meetings listed above and thorough the online media considered in the communication plan. In parallel, starting from December 2017 (Month 26) a series of meetings both, in person and via Skype were constantly held with the PERFORM SC (**UOC, TBVT, UAB, UoB, UNESCO, EUSEA**) to define the contents of the sessions and the role of the PERFORM stakeholders participating. Further meetings were also organised with **UOC** to follow up the process. In February 2018 (Month 28) the registration process to the conference begun. The actions to involve different stakeholders communities were developed by identifying and inviting other European Funded projects to join the PERFORM conference and developing specific actions to maximize the effectiveness of contents presentations during the conference.

1.2.7 Work Package 7 (WP7): Ethics requirements [Months: 1-36]

No further activities have been developed during the reported period.

1.3 Impact

Over the reported period an increase was observed in all the online communication channels.

Twitter followers reached the number of 433 (Month 30) from 229 (beginning of Month 16), which shows a considerable increased in the number of followers. The Twitter, as anticipated, highlighted a constant trend to increase the number of followers. As described in Figure 1, a total of 114 followers were reached during the period M25 – M30 (+36%) and the interactions with the tweets produced also highlight a relevant trend with **109,760 tweet impressions.**

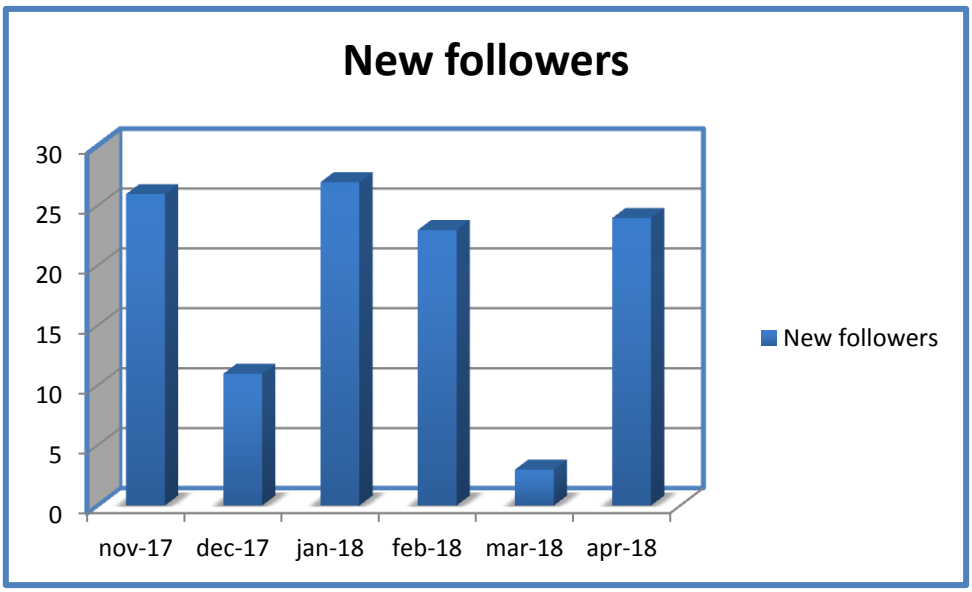

Figure 1. New followers per month from M25 to M30

In turn, the PERFORM **Facebook** likes also reflects an increasing in the followers of the Facebook page of the project that reached **671 *likes*** in April 2018 (Month 30, Figures 2 and 3). There was a relevant increase in May 2017 (Month 19) during the period around the European Researchers' Night Coordinators day and the EU Institution Open Day as well as in October 2017 (Month 24) after the publication of the videos related to the teachers and early career researchers toolkit. Also, in January 2018 (Month 27) there was an increase that might be due to the launch of the second PERFORM newsletter.

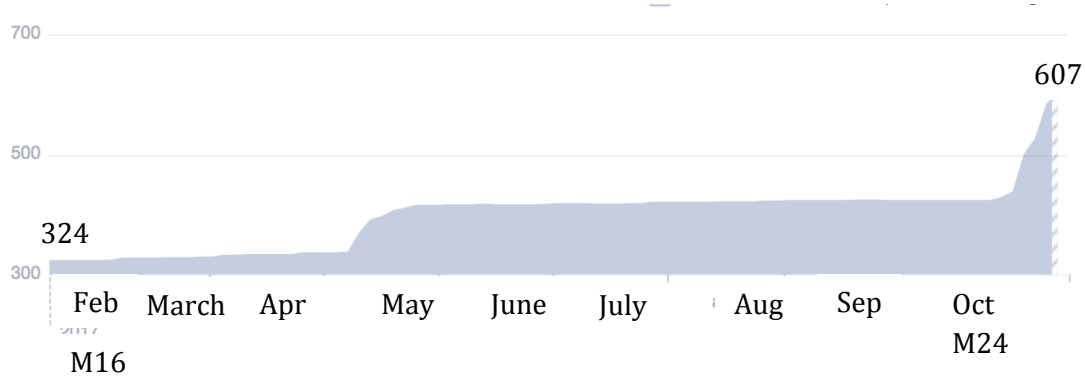

Figure 2. General trend of *like* number on the PERFORM Facebook page M16-24.

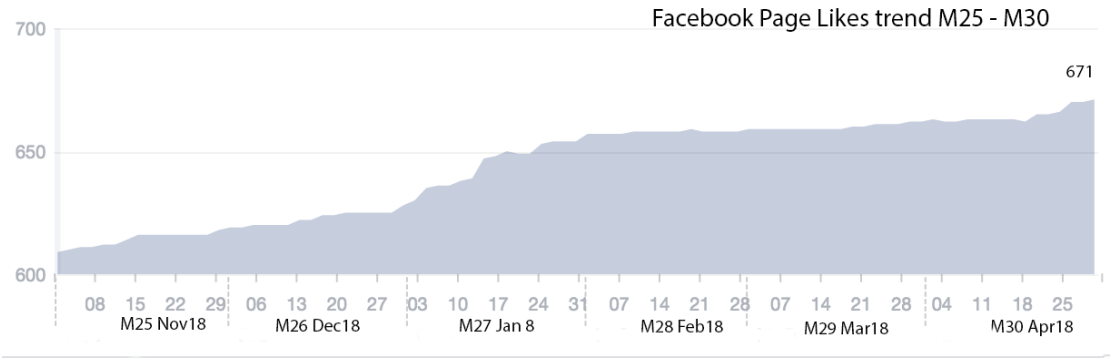

Figure 3. General trend of *like* number on the PERFORM Facebook page M25 – M30

Website data show that between February and October 2017 (Months 16 to 24) **2405 users** were active consulting the information published corresponding to **3685 sessions**. Among the visitors in these months over two third were new visitors (Figure 4). In turn, from November 2017 to April 2018 (Months 25 to 30) an improved trend in the PERFORM website users was registered and described by the following data: **2610 users entered the webpage.** A total of **5015** users visited the website from M16 to M30 almost doubling the number of the users in the previous period reported above. Moreover, the percentage of new users was also excellent. These new users entered into **4182 sessions** with an average duration per session of 2'47'' A total of 7867 sessions were opened from M16 to M30.

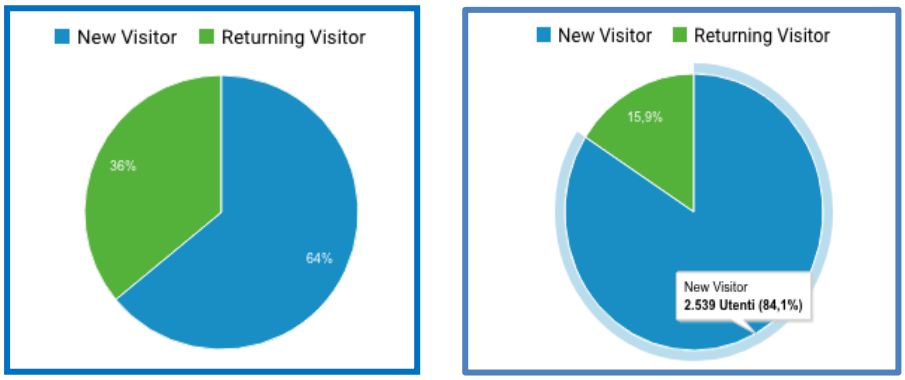

Figure 4. General trend of users of PERFORM webpage in M16-24 (left) and M25-30 (right).

The visibility obtained during this period was also due to the participation to 42 outreach and dissemination events in Europe and outside that made it possible to start and develop collaboration with other networks and communities further described in Task 6.2.

It is also worth to notice that teachers from one of the French schools participating in the PWs during 2017, Vauréal, replicated similar activities in 2018 by themselves. They used the protocols of the PW implemented by **TRACES** and reported that "worked very well". Students played scientific performances at Vauréal School by the end of April 2018 (Month 30).

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

The development of the actions defined during the first period and the observation of their implementation during the last reporting period led to the following breakdown of future actions until May 2018 (Month 31) that precede the Final Conference in June 2018 (Month 32). This has not to be considered as an update of the plan structure but a description of its implementations.

(a) Communication strategy development and implementation on social media and the web

Objectives:

- Increase the participative process of publication on social media and the webpage by the consortium partners
- Increasing the visibility through social media and webpage/s aiming at least to a + 30% by the end of the Period considered
- Making the final conference a communication event

Tools:

Preliminary results produced during the summer 2017 by the partners involved developing participatory performances and toolkits that were and will be presented through:

1. Videos and documents published on the webpage and promoted through the social media and through the YouTube channel.
2. Production of articles by partners on the advancement and results of the project.
3. Facebook campaign both sponsored and not, organized promoting events of the Project such as training courses, publication of new results and materials, etc.., and

posting messages or news related to the project topic: innovation in education, Information/event/publication on RRI, Project partners activities etc.
4. Twitter constant activity with daily tweets and bi-weekly focuses on specific actions of the project.

(b) Outreach and dissemination actions identification and implementation

Objectives:

- Broaden the number of stakeholders made aware of the PERFORM progress and results
- Partner with other RRI focused EU funded project (e.g. Nucleus, HEIRRI, FIT4RRI) to disseminate the PERFORM progress and results

Tools:

1. Briefs and digital fliers targeted to the different stakeholders explaining what it is in PERFORM for them.
2. Articles to be published in different online platforms.
3. Pictures archive to be provided to stakeholders who want to publish information about PERFORM.

(c) Final Conference planning and communication of contents

Objectives:

- Finalize the conference programme in order to make it a combination of sessions for project results presentations and engaging events based on performing arts and STEM education.
- Make the stakeholders community aware of the Final Conference contents, namely: early career researchers, teachers, performers/science communicators, policy makers involved in education policies.
- Defining all the communication actions to be implemented during the conference in order to produce effective communication material related to the event (video, pictures, press office plan for the event, social media management during the event, etc…)

Tools:

1. Digital brochures and banners to communicate the Final Conference dates, contents and the preliminary and final programme.
2. Digital versions of the invitations to be sent to main stakeholders and institutions.
3. Brochures and fliers to be distributed by EUSEA and the consortium partners to their stakeholders' networks.
4. 1 short video teaser to be used to advertise for the conference.
5. Communication material (roll-up and banners, stickers, gadgets and other communication materials that might be useful to enhance the visibility of the main results of the project) to be defined with the coordinator and with **UNESCO** to be used during the conference.

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

The Data Management Plan (D1.4) was updated in p.19 to clarify the preferred open access scheme for publication, as follows: "Articles will be published in open access according to a

green open access scheme, as defined in the Guidelines on Open Access to Scientific Publications and Research Data in H2020".

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

During this period WP leaders worked on addressing each of the main recommendations from the previous review as follows:

#1. The project website should be more developed and it should be more attractive for final users. Videos on the website should give more time for the students' feedbacks on the events they have participated and impacts they have received

As the first results of the project were produced, **EUSEA** and **UOC** coordinated efforts with other partners to develop the website by including videos and guidelines addressed to teachers and researchers for developing participatory workshops. In order to reach these target audiences the page was also promoted through the social media by partners. We plan to enhance this approach coherently with the production of the project outputs.

During the reporting period a set of feedback from students and pictures were collected by PERFORM partners and will be published in the website by **EUSEA** developing a section that can be as attractive as possible considering that the PERFORM project is a research project and not a communication project addressed to students.

#2. The project should enhance application of social networks to reach the pupils and promote STEM education among youngster

Partners involved in the development of the activities with students (mainly **TBVT, SMS** and **TRACES**) intensively encouraged the use of social media among pupils during the development of the activities. Although the preliminary impact assessment showed relevant enthusiasm of the students while doing the activities, they did not to consider these activities to be "sharable" through social media among their communities. However, an effort was put to create WhatsApp group with early career researchers and students to collect dialogues that might be of interest and fragments of those conversations might be published on the PERFORM website as traces of the conversation developed during the project highlighting some aspects of the experience done by the students.

In order to reach out young audiences and teachers **EUSEA** started a process to verify whether it was possible to produce short videos with popular Youtubers (namely one Youtuber in Spain and one Youtuber in France). The aim of these short videos is to enhance the visibility of the project contents through their contacts. At the moment, the person who is responsible for the communication and dissemination actions is checking whether this is feasible coherently with the planned budget that, in the beginning of the project, did not include this specific cost.

#3. The final user for the project activities should be more involved (i.e. to address larger number of school teachers)

A series of actions were planned to increase teachers' involvement in PERFORM activities.

In Spain, the second teacher training will be implemented in July 2018 (Month 33). To increase teachers' interest in the training, dissemination actions conducted by **TBVT** highlighted the good results obtained during the PW in the two schools involved in 2018, and the opportunity for

teachers of learning activities that will increase students' interest in science communication, being able to become scientific communicators. **TBVT** advertised the Spanish training to all the secondary schools included in their database (>3000), the ones in the database associated to **UNESCO** and to the teachers that participated in the activities conducted in 2017 and 2018, asking them to act as ambassadors to disseminate the course to their mates.

Also, in order to attract teachers, ECR and science communicators and make them more close to the main results obtained, **TBVT** designed a user-friendly version of Deliverable 2.1 based on videos with an intuitive and easy-going format. TBVT distributed this tool by e-mail to its database of stakeholders (>5000), published it through its social media, and **EUSEA** published it in the PERFORM web page and **UOC** uploaded the document to Scientix and RRI-Tools webpages. **TBVT** is also preparing a user-friendly version for Deliverable 2.2.

In Bristol the quality and relevance of the PERFORM experience for teachers was improved in the following ways.

First, the teacher role in PW was given more consideration, resulting in more active involvement: participating within group work rather than just observing and organising details of the final performances. This enhanced collaboration with teachers during these workshops led to a positive relationship with the teachers and their increased engagement; with two UK teachers agreeing to join **UoB** and represent PERFORM at conference in June 2018.

Second, **UoB** worked with theatre company Kilter to create a second round of teacher training that responded directly to some teacher´s concerns (disruptive behaviour, lack of time for these type of activities). For example, the training for teachers was held the in a 'science classroom' (instead of a theatre space) ensuring that the techniques we incorporated into the session were short and required no movement around the classroom. Both of these alterations aimed to build confidence and receptiveness in the teachers and led to a marked difference in attitudes to the potential for integrating these performance techniques into a science class. **UoB** aims to mitigate against these same barriers when creating the toolkit for teachers (D.3.2).

Third, **UoB** also planned and began to implement a consultation schedule with teachers in order to test out the different elements of the toolkit for teachers (D.3.2). **UoB** attended the Association of Science Education conference in January 2018 and held a PERFORM workshop for science teachers, the final section of the workshop brainstormed 'what teachers look for in a toolkit'. Topics included: where teachers looked for toolkits, what content was particularly valued and what puts them off certain resources. Feedback has been integrated into the design and rationale of the teacher toolkit, ensuring that the toolkit will be in a format that teachers are able to use in their classroom.

In France, **UNESCO** will invite teachers and students of international schools to participate in the PERFORM final conference to be held in Paris in June 2018. **TRACES and UoB** are working on finding ways to involve more teachers.

#4. The consortium should develop the contacts with new stakeholders and new final user of the project

The consortium already built up ties with academia and other related teaching institutions or unions, such as:

Universities: Universitat de Barcelona (Spain), Universitat Pompeu Fabra (Spain), University of Madison (USA), University of Bordeaux (France);

Research Center: WISERD Education (Wales institute of Education Research at Cardiff University), Centre de Recherche Interdisciplinaire (France), Barcelona Education Consortium (Spain);

European Network of Teachers: Scientix, European SchoolNet;

UNESCO with its long experience in education and basic science is further disseminating and link PERFORM within its network of Chairs in Education, Science Education, and within its institutes dedicated to education / science education such as: Technical and Vocational Education and Training (TVET); The World Academy of Sciences for the advancement of science in developing countries (TWAS); International Centre for Theoretical Physics (ICTP); The European Organization for Nuclear Research (CERN).

#5. The logo of the EU should appear in every publication

The CT at **UOC** ensured strict compliance with this obligation by including the EU logo in each communication led by **UOC**, periodically reminding PERFORM partners about the obligation of including the logo in the communications led by them, and (when possible) supervising that the logo of the EU was included in partners' communications.

For the events performed in Barcelona, **UOC** produced a roll-up with the logos of PERFORM and EU flag.

#6. The consortium should think about the sustainability of the project after the EU funding (i.e. to plan the set of smaller-scale project with financial support on the local or national level, in peculiar educational environments)

As part of **UNESCO** assignment in PERFORM, the concept of 'myPERFORM' was designed and included in the Sustainability Plan (Deliverable 5.1). The goals of 'myPERFORM' are as follow:

1. Expand and adapt the original PERFORM concept worldwide with a particular focus on developing countries;

2. Ensure project adaptability in providing tailored project agenda conducive to daily realities and environment of final beneficiaries;

3. Foster early scientific engagement by extending the scope of the project towards youth in primary and secondary school education;

4. Empower local stakeholders via the myPERFORM Ambassador Programme (MAP) initiative.

5. A series of meetings with **UNESCO** Member State representatives has already started to present and promote 'myPERFORM'.

After completion of the PERFORM project, 'myPERFORM' will be implemented in two different phases. The first phase of the project will consist in training and capacity building activities with and for students, teachers and young researchers in selected countries. In the second phase, myPERFORM Ambassador Program (MAP) will be developed. This program will mainly consist on the fact that trainees will train their communities at national and regional level.

UNESCO is currently advocating for myPERFORM with the hope of finding potential partners and donors to allow its implementation once PERFORM ends.

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

5.1 Tasks

Not applicable in this reporting period.

5.2 Use of resources

The PERFORM GenA agreed in the project intermediate meeting in Bristol in April 2017 (Month 18) in a pm redistribution in order to address **TRACES** underestimated budget and the reallocation of responsibility in Task 2.2 and Task 3.3, as follows:

- **TBVT** transferred 2pm to TRACES
- **UOC** transferred 1 pm to TRACES
- **AJA** transferred 1 pm to TRACES
- **UoB** transferred 0.7pm to TRACES

UoB engaged a videographer in Barcelona to capture video footage of the teacher training delivered by **TBVT** in July 2017 (Month 21) – expenditure of €751.31 that was not anticipated in the DoA. This video footage served two purposes. Firstly, to give an insight to the **UoB** team about how the training was received in the room and how the activities worked, in order to inform the development of the further teacher training in Spain as well as the trainings in the UK and France. Furthermore, as the training was delivered entirely in the Spanish language, and the **UoB** team is not Spanish speaking, it would have been difficult for them to do that in person. Additionally, it is anticipated that some of this footage will be able to be used for the toolkits for teachers that WP3 will produce.

In September and October 2017 (Months 23 and 24) **SMS**, following the schools' recruitment, delivered detailed discussions with teachers, formats and timetables ratified with participating schools within Task 2.2. A requirement in UK schools of financial support raised to provide teacher cover was highlighted in this period. This support was required because the student participant numbers required in each school are half the size of a full class. A sum of €600 was agreed to be provided by **TBVT**.

In April 2018 (Month 30) **UoW** participated in the PSCT conference. This was an unforeseen travel in the DoA but the reallocation of the budget to attend the conference did not endangered other committed activities by **UoW**. During the conference, on April 4, **UoW** led a workshop on 'How to evaluate science communication impact using survey methods' featuring PERFORM project as an example and highlighting its methodology for impact assessment. Furthermore, on April 5, **UoW** presented a paper and participated in roundtable discussion entitled 'The art and science of engagement: a global perspective on science communication through the arts' drawing on PERFORM project WP4 research results.

During the last six months there might be some other deviations not listed in the present report given that the financial reports of some partners are not finished yet. The CT will include this information in the Final Report.

5.2.1 Unforeseen subcontracting (if applicable)

Not applicable.

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

Not applicable.