FINAL PROJECT REPORT

OUR SPACE
OUR FUTURE

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement N° 821871

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1. SUMMARY

Summary of the context and overall objectives of the project.

Our Space Our Future was established to design and run sustainable education and outreach activities for diverse audiences in five countries with the message that careers in space science are accessible to all. Using evidence-based practice to steer the creation of content and a rigorous academic evaluation, we also aimed to understand more about what interventions are most successful in terms of raising aspirations around careers in young people.

Our Space Our Future engaged over 8,000 people directly across the programme, plus an estimated 2,000+ as indirect participants via teachers, in terms of raising awareness of our key message.

The project worked directly with 4,741 students across the five partner countries with a longitudinal evaluation study to explore improved scientific literacy, interest and, confidence in space science themes. The study will also assess the impact on the career aspirations of the directly participating students. The project ran across five delivery countries – Denmark, England, Italy, Portugal, and Wales.

Through the project's community engagement events – aiming to involve the adult influencers of the students in supporting them with STEM career confidence – a further 3,428 participants were reached.

The content developed has been captured and will remain online as a toolkit for educators to use. The learning from the academic study of effectiveness and impact will be published in a peer-reviewed journal and offered to practitioner publications to ensure our results benefit the wider education community.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved

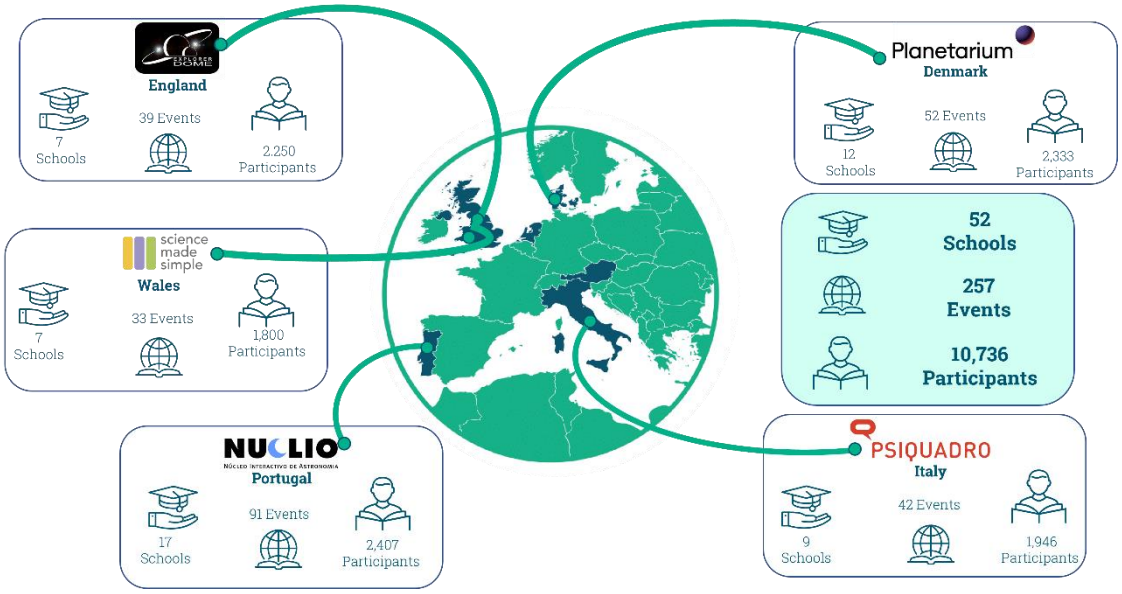


*Figure 1: Summary of **Our Space Our Future** delivery (schools, CPD, community & indirect cascade through teacher CPD) in each country*

Project partners had been selected due to their experience in different aspects of inclusion and in raising aspirations around STEM careers. All partners shared the vision of embedding this project in good practice drawn from previous learning, so an important starting point was to conduct an extensive literature review on what is already known. This provided sound evidence to demonstrate the theoretical background and rationale for Our Space Our Future and continued to inform the delivery programs and evaluations that were needed throughout the project.

Ethical Approval documentation was completed at the beginning of the project which allowed us to proceed with work packages that require data collection from target audiences and ensured that our final results could be shared and published as widely as possible.

The Communication, Dissemination and Exploitation Plan outlined to consortium members the strategies and activities for the project that was put in place, and the website and extensive use of social media have been successful in promoting the project to a broader public audience. An audience reach of over 750,000 has been achieved.

Cardiff University as the lead beneficiary set-up a Project Handbook providing guidance for all project partners on deliverables, timelines, and financial reporting. A Project Intranet was put in place using Microsoft Teams to allow communication between the consortium and this provided space for all documentation to be stored and worked on collaboratively. These two sources have assisted in the Project Management activities to allow consortium partners to understand their roles

within the work packages and allow communication between each other to complete set tasks.

An International Stakeholder Group and local Advisory Groups from each partner country were established to help support and evaluate the delivery programs. Delivery partners worked informally with local advisory group members to ensure careers messaging was appropriate and relevant to each geographical area. The local advisory groups also helped by suggesting suitably diverse role models that showcased a wide range of space sector careers.

An Audience Development Plan and Audience Recruitment Report was written, and this allowed all delivery partners to select their schools according to the criteria set out in the proposal and for schools selected to be checked against these criteria.

Each delivery partner worked with a target of 10 schools in their country working with an average of 100 students per school. Four interventions were planned with the same students to build up the familiarity of the delivery partners with the students and to build up the message that careers in the space industry can be for everyone. In each country, the focus of this message was around changing the stereotype that working in space only means being an astronaut or exploring distant worlds. Each partner was tasked with the challenge of ensuring students encountered diverse ways they could contribute to the space industry and meeting various role models from local industries along the way. There was also an emphasis on how the space industry sector helps benefit us here on earth with a focus on climate change issues and earth observation technologies.

To supplement this work, interventions were planned with the teachers and parents of those students on the project. This was based on the evidence that parents and teachers are strong influencers on the careers' choices of young people. Reaching our intended audience of parents and teachers was much more challenging due to the COVID-pressures on schools and the inability to hold community and parent events. Each partner found innovative ways to connect with parents remotely by promoting the work done by the students through video and online content where possible. Teacher training CPD was harder to achieve as so many teachers at this time were not able to attend any non-essential events due to the additional pressures placed on them with school closures.

Despite our adaptations we have succeeded in evaluating the impact of the project on students and the wider public and this is outlined in full in our impact evaluation report.

Progress beyond the state of the art, expected results until the end of the project and potential impacts (including the socio-economic impact and the wider societal implications of the project).

The objective of Our Space Our Future was to change attitudes to careers in space science and attract a more diverse workforce for the future of the sector across Europe and beyond. By using a rigorous summary of the literature to inform our approach we felt our multiple interventions, and the use of a 'whole school' approach would be most effective. A secondary goal was to ensure rigorous evaluation was conducted for the project to capture learning about what works such that other actions for the future can be informed and improved. Many outreach programmes do not have the resource or skills to conduct this level of robust evaluation on a day-to-day basis, so this took the project beyond the state of the art.

We reached 4,741 students directly across the five countries with multiple interventions involving students and their influencers (parents, teachers and, community). In total 100,000+ students, teachers and wider communities encountered the resources of the project to improve their confidence, scientific literacy, interest and attitudes to STEM subjects. Additional targeted activity through social media (OSOF Facebook, Twitter, Instagram, YouTube and partner social media) saw a further audience reach of over 750,000 and we built social media followings of between 800-2000 on our various OSOF channels.

The key messages delivered were around the relevance of the space industry in providing a better quality of life for all, and future benefits to our planet. Partners have attended national and international conferences, meetings, and events to present Our Space Out Future to our target audience and stakeholders. A legacy will be established from the learning of the impact evaluation and the change in practice within the delivery partners in each country.

2. ABBREVIATIONS

Abbreviations	Definition
Our Space	Our Space Our Future project
EC	European Commission
H2020	Horizon 2020 funding programme
CPD	Continued Professional Development
CU	Cardiff University
ED	Explorer Dome
EIT Climate-KIC; C-KIC	European Institute of Technology and Innovation-Climate Knowledge and Innovation Community
EUSEA	European Science Engagement Association
NUCLIO; NUC	Portuguese Interactive Astronomy Nucleus
PDK	Planetarium Denmark (formerly Tycho Brahe Planetarium)
PM	Person Month/s
PSC	Psiquadro
R&I	Research and Innovation
SMS	Science Made Simple Ltd
TDTS	Thinking, Doing, Talking Science

3. OBJECTIVES

Objective 1

To adopt a whole-school approach with 50 schools in 5 countries, engaging key influencers (teachers, school senior management and parents) to encourage and support students to pursue an active interest in space-related themes, opting for STEM subjects and careers.

Delivery partners (SMS, ED, PSC, NUC, PDK) developed approaches to identify audiences appropriate to the aims of the project and developed plans to create content and recruit audiences pertinent to the achievement of objective 1. Details of the evidence used to inform the selection of schools is given in D2.1 & D5.2 Literature Review, D2.2 Stakeholder Group Report, D2.3 Audience Development Plan and D4.1 Audience Recruitment Plan. A total of 52 schools in five countries engaged with the project.

Objective 2

To reach 5,000 children and young people from diverse backgrounds, working with disadvantaged students and those traditionally underrepresented in STEM subjects through the design and delivery of evidence-based, high impact, co-created, meaningful, relevant and inspiring workshops, shows and activities in schools. Our Space will work in partnership with schools in areas of geographic isolation, high deprivation, and where student attainment in science subjects is declining.

Delivery partners (SMS, ED, PSC, NUC and PDK) developed content and recruit audiences. D2.3 Audience Development Plan and D4.1 Audience Recruitment Plan. D3.1 Repository of Activities, D3.2 Toolkit Report & D3.3 Toolkit Methodology Report demonstrate the process of developing and delivering the activities. D4.2 Delivery Programme Progress Report and D4.3 Summary Report on Delivery Progress captures the delivery data. A total of 4,741 students received all four Our Space interventions. A higher number of students (5443) received one or more of the interventions but were unable to complete all of four.

Objective 3

To establish a Stakeholder Group that brings together the wider landscape of formal and informal educators, research scientists and industry professionals working within space science fields. This group will inform the Our Space programme development in addressing space industry skill-set requirements, taking a strong

career-based focus, and providing positive and inspirational scientific role models for the students.

ED developed a rationale for identifying, selecting and recruiting International Stakeholder Group members detailed in D2.2 Stakeholder Group Report. The Our Space International Stakeholder Advisory Group was established and supports project delivery. Stakeholders have been updated on project outcomes and challenges through regular emails and newsletters. Over 70 external stakeholders from a variety of backgrounds and space related careers have assisted with school interventions, project dissemination and support, either directly or indirectly.

Objective 4

To provide direct Continuing Professional Development (CPD) workshops for 500 formal education professionals to teach space sciences with inclusivity, resulting in reaching a further 10,000 students with inspiring content and promoting confidence in students of all genders, backgrounds and abilities, working in collaboration with our consortium partners, stakeholder group and their teacher networks.

Delivery partners ((SMS, ED, PSC, NUC and PDK) worked together to establish country-specific teacher interventions according to the local situations with the partner teachers during the pandemic. External expertise on good practice in STEM teacher training was delivered by contractors The Oxford Trust during the co-creation meeting in Perugia at the beginning of the project. 185 teachers attended the Our Space CPD events. In the evaluation, teachers stated they would increase the frequency of space related activities in their classroom to once a term. Assuming each of the teachers go on to teach at least one class with their new skills then this would reach a further 5,500 students across the five countries. Our evaluation confirmed that at least 2382 students would be reached by these teachers through the indirect involvement cascade. D4.2 Mid-Term Delivery Progress Report and D4.3 Summary report on Delivery Programme report details these figures and explains the challenges of running CPD events in a global pandemic. In the UK many schools were not allowing teachers to participate in any extra-curricular activities or CPD during the lockdown periods, whereas we found other countries had a more relaxed approach.

Objective 5

To directly reach 10,000 children and adults in family and public groups with inspirational and engaging shows and workshops, building partnerships with high impact, regional and national campaigns/events that promote project activities and European space programmes

Delivery partners (ED, SMS, PSC, NUC and PDK) developed approaches to identify audiences appropriate to the aims of the project and developed plans to create content and recruit. D2.3 Audience Development Plan and D4.1 Audience Recruitment Plan. The process of developing and delivering the activities was formed through D3.1 Repository of Activities, D3.2 Toolkit Report & D3.3 Toolkit Methodology Report. The Our Space website contains our Toolkit, developed from D3.4 Online portal with interactive resources, and also hosts related space science and career content from other European organisations and projects.

The 14 community events held by OSOF delivery partners resulted in a direct target audience reach of 3,428, and further events at which Our Space partners attended and participated in reached 1,662 additional family audiences. D4.2 Mid-Term Delivery Progress Report and D4.3 Summary Report on Delivery Programme reports in detail on the formats, schedules and numbers of children, adults/wider community members the project has reached, and the challenges faced reaching our target of 10,000 with conducting these events during the Covid pandemic.

Objective 6

To create a far reaching, social media campaign that engages 35,000 students and the wider public across a variety of digital platforms to showcase existing, excellent collections of resources and activities that support this programme.

EUSEA developed and monitors the Our Space social media channels and the project website. Evidence of this is detailed in D6.1 Communication plan, dissemination and exploitation plan. Social media channels are being used by all partners to disseminate information, content and events relevant to space science and Our Space. The project has exceeded its target of 35,000. There has been a total reach of over 610,000 through our 3 social media channels and over 10,000 interactions with the Our Space website. A further 4,000 interactions were achieved through online events organised by Our Space or where Our Space has participated in other organisations' events. D4.2 Mid-Term Delivery Progress Report and D4.3 Summary report on Delivery Programme report on the formats, and on engagement numbers reached in more detail.

Objective 7

To provide valuable longitudinal evaluation, utilising both quantitative and qualitative data, to investigate measures of student STEM attainment, increased scientific literacy, confidence and personal interest in space sciences, STEM subject choices and space related career aspirations.

The Evaluation framework and the instruments for data collection were refined and reviewed at the start of the project to analyse pre-evaluation data. Evidence of

this is reported in D5.1 Evaluation Framework Report and D5.2 Pre-Evaluation Data Report. This development allowed a robust evaluation data collection and analysis. The project has analysed data from over 50% of students attending the Our Space interventions, and 41% of teachers attending our CPD sessions. This response to the evaluation far exceeds our target of 5% and 20% respectively. Focus groups with 30 of the students were also conducted by delivery partners to provide extra qualitative data. D5.3 Final Evaluation Impact Report details the analysis of the data collected both pre and post student intervention. This report also captures quantitative and qualitative data from community events and teacher CPD sessions. The evaluation plan has undergone ethical review and the results will be published in a peer reviewed academic journal.

Objective 8

To work with the Climate-KIC to establish a collaboration platform between delivery agents of space education and Innovation, linking existing EIT KICs and exploring the feasibility and role of a dedicated space-themed KIC.

Climate-KIC have interacted with Stakeholders and organisations within the space sector to assist with the reporting on the feasibility of a future Space-KIC. A workshop was held in conjunction with Space EU in October 2019 to build relationships with those involved in academia, business and industry within the space sector. A White Paper (A Collaboration Model for the European Space Community) was written on the outcomes of the meeting and supported initial discussions with the high-level actors in the Space sector. This work is detailed fully in D2.4 Feasibility Study into the Development of a Future Space KIC.

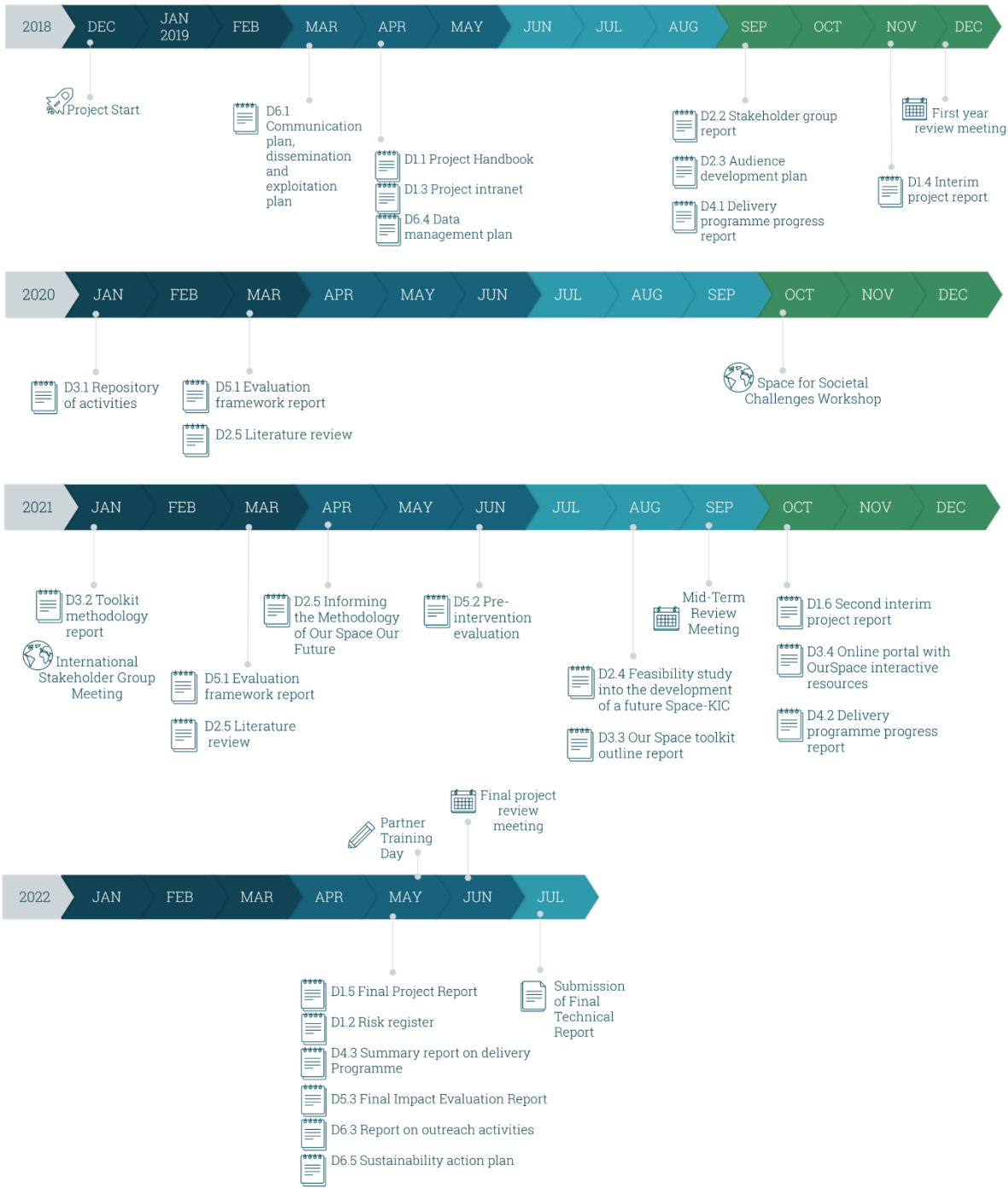
Objective 9

To develop a long-term sustainability action plan for Our Space to effectively disseminate the strong theoretical background and evidence-based methodologies and delivery techniques to allow future programmes to learn from the challenges and successes of Our Space.

The Our Space consortium, led by C-KIC, has investigated the sustainability of the project outcomes and the sustainability of the existing consortium through the analysis of different governance options for its future operation. Analysis of the Our Space methodologies determined in D2.1 and D2.5 Literature Reviews were considered alongside insights gathered through intervention delivery during the project, and how this could be improved to be more user friendly and accessible to a wider audience post project. Scenarios for continuation of the Our Space program, including structure and funding sources, were discussed in detail by the consortium to develop a legacy for the knowledge and resources created. The Our

Space Toolkit's future use and promotion of our resources through links with other European educational and space related organisations is documented in **D6.5 Sustainability action plan**, alongside lessons learnt from the project. **D6.5 Sustainability action plan** will be made public on Our Space website to allow other educators, or those in a similar field to learn from our project.

4 PROJECT TIMELINE



Project timeline over the 42 month, detailing submission of Deliverables and Our Space review meetings.

4.1 Deliverables

#	Deliverable Name	WP no.	Lead Beneficiary	Type	Dissemination Level	Delivery Date from Annex 1	Actual Delivery Date	Status	Comments
D1.1	Project Handbook	WP1	CU	Report	Confidential	28 February 2019	30 March 2019	Submitted	Approved
D1.2	Risk Register	WP1	CU	Report	Confidential	30 November 2021	31 May 2022	Submitted	Approved
D1.3	Project Intranet	WP1	CU	Websites	Confidential	28 February 2019	30 March 2019	Submitted	Approved
D1.4	Interim Project Report	WP1	CU	Report	Confidential	30 November 2019	30 November 2019	Submitted	Approved
D1.5	Final project report	WP1	CU	Report	Public	30 November 2021	31 May 2022	Submitted	Approved
D1.6	Second interim project review	WP1	CU	Other	Confidential	30 November 2020	20 October 2021	Submitted	Approved
D2.1	Literature review	WP2	ED	Report	Public	30 April 2019	30 April 2019	Submitted	Approved
D2.2	Stakeholder group report	WP2	ED	Report	Confidential	30 September 2019	30 September 2019	Submitted	Approved
D2.3	Audience development plan	WP2	ED	Report	Confidential	30 September 2019	30 September 2019	Submitted	Approved

D2.4	Feasibility study into the development of a future Space-KIC	WP2	ED	Report	Confidential	28 February 2021	31 August 2021	Submitted	Approved
D2.5	Informing the Methodology of Our Space: what practices truly involve, excite and empower school aged students to feel space sciences are relevant for them?	WP2	ED	Report	Public	30 April 2021	30 April 2021	Submitted	Approved
D3.1	Repository of activities	WP3	PSC	Report	Confidential	31 December 2019	31 January 2020	Submitted	Approved
D3.2	Our Space toolkit outline report	WP3	PSC	Report	Confidential	31 March 2020	25 August 2021	Submitted	Approved
D3.3	Toolkit methodology report	WP3	PSC	Report	Confidential	31 May 2020	31 January 2021	Submitted	Approved
D3.4	Online portal with Our Space interactive resources	WP3	PSC	Websites	Public	30 June 2020	31 October 2021	Submitted	Approved
D4.1	Progress report on audience recruitment	WP4	SMS	Report	Confidential	30 September 2019	30 September 2019	Submitted	Approved
D4.2	Delivery programme progress report at mid-term meeting	WP4	SMS	Report	Confidential	31 May 2020	11 October 2021	Submitted	Approved
D4.3	Summary report on delivery programme	WP4	SMS	Report	Confidential	31 August 2021	31 May 2022	Submitted	Approved
D5.1	Evaluation framework report	WP5	CU	Report	Confidential	31 July 2019	28 March 2020	Submitted	Approved
D5.2	Pre-intervention evaluation	WP5	CU	Report	Confidential	31 May 2020	30 June 2020	Submitted	Approved

D5.3	Final impact evaluation report	WP5	CU	Report	Confidential	30 November 2021	31 May 2022	Submitted	Approved
D6.1	Communication plan, dissemination and exploitation plan	WP6	EUSEA	Report	Confidential	28 February 2019	29 March 2019	Submitted	Approved
D6.2	Website and social media launch	WP6	EUSEA	Websites	Public	31 March 2019	29 March 2019	Submitted	Deleted. Included in D6.1
D6.3	Report on outreach activities	WP6	EUSEA	Report	Public	30 November 2021	31 May 2022	Submitted	Approved
D6.4	Data management plan	WP6	EUSEA	Report	Confidential	30 April 2019	21 February 2020	Submitted	Approved
D6.5	Sustainability action plan	WP6	EUSEA	Report	Confidential	30 November 2021	31 May 2022	Submitted	Approved
D7.1	POPD Requirement No.7	WP7	CU	Ethics	Confidential	31 March 2019	30 April 2019	Submitted	Approved
D7.2	POPD Requirement No.8	WP7	CU	Ethics	Confidential	31 March 2019	30 April 2019	Submitted	Approved

4.2 Milestones

#	Milestone title	Related WP #	Lead beneficiary	Delivery date from Annex 1	Means of verification	Achieved	Comments
M1	Stakeholder group established	WP1, WP2, WP6	CU	28 February 2019	Stakeholder group established	30 September 2019	
M2	Website and intranet set up	WP1, WP6	EUSEA	28 February 2019	Our Space website and internal portal set up	30 Mar 2019	
M3	Evaluation framework developed	WP5	CU	28 February 2019	Evaluation framework - agreement from all countries on research questions to be addressed	13 September 2019	
M4	Capacity review complete	WP2	ED	30 April 2019	Capacity review complete	30 April 2019	
M5	Ethical permission sought in each country to conduct evaluation	WP4, WP5	CU	31 July 2019	Ethical permission documentation	13 September 2019	
M6	Feasibility Space KIC	WP2, WP6	ED	28 February 2021	Collating learning and stakeholder views from the project experience to produce a feasibility report on the Space-KIC	31 August 2021	
M7	School recruitment	WP4	SMS	30 September 2019	All schools and teachers recruited to the project in the four delivery countries	30 September 2019	
M8	Delivery programme	WP3	PSC	31 December 2019	Country specific delivery programmes developed and scheduled	31 Mar 2020	

M9	Training retreat	WP1-6	PSC	31 December 2019	Training re-treat to bring together stakeholders and delivery partner experiences and co-create joint programme for subsequent delivery in countries. Also includes training on evaluation strategy for delivery partners to implement.	10 October 2019	
M10	Mid-term internal	WP1	CU	31 May 2020	Mid-term internal review	9 September 2021	Delivery date move to (September as a result of impacts of COVID
M11	Community event per country	WP4	PSC	31 May 2020	Delivery of one community event per country	31 March 2022	Community events were delayed in their start dates due to COVID. Community events started in Febraury2022 and finished in May 22
M12	School program complete	WP4	SMS	31 July 2021	Country specific school delivery programmes complete	30 April 2022	Delivery date to move due to impact of COVID
M13	Impact evaluation of Our Space delivery complete	WP5, WP6	CU	30 Sep 2021	Delivery of final evaluation report to all partners and link into dissemination plan	31 May 2022	Delivery date to move due to impact of COVID
M14	Methodologies, outcomes and recommendations complete	WP1, WP4, WP5, WP6	CU	30 November 2021	Resources and reports available on project website for further dissemination through consortium and stakeholder group	31 May 2022	Delivery date to move due to impact of COVID

M15	Sustainability Action Plan	WP1, WP5, WP6	CU	30 November 2021	Final project report issued	31 May 2022	Delivery date to move due to impact of COVID

5 EXPLANATION OF THE WORK PER WORK PACKAGE

5.1 Work Package 1

Summary WP1

WP1, led by CU, oversees the management and delivery of the project, ensuring completion of project objectives and deliverables. This has been achieved by setting up an internal project intranet (using Teams), regular meeting and reporting schedules, and maintaining communication between consortium members and to the EU. Communications were regularly monitored and adapted if necessary – for example during the Covid pandemic when more meetings were required to mitigate the effects of Covid on project delivery and ensure we had up-to-date information of country specific circumstances.

Task 1.1 Project management activities

The Consortium Agreement was set-up at the start of the project. It is available for all partners to view on the Our Space Teams Channel. The project manager has been responsible for coordinating and supervising the legal, technical and financial management of the project. The project manager has been able to provide support to consortium members regarding internal reporting and reporting to the EU.

Task 1.2 Scientific coordination and project monitoring

CU is responsible for ensuring the coherent scientific direction of the project across all work packages and delivery partners. This has been achieved by regular meetings and discussions with the consortium members. Meetings for Work Package leaders took place every two months with a verbal report on progress. Consortium meetings were held every six weeks until the last six months of the project where meetings took place every month to ensure delivery of project objectives. Six-monthly internal reports describing task progress, milestone and deliverable achievements, any anticipated deviations from the work plan and associated risks were completed and reviewed by the project manager and PI for progress. D1.4 Interim Project Report and D1.6 Second Interim Project Review have been submitted and they describe the work completed.

The D1.2 Risk Register has been maintained and reviewed as part of the internal 6-month reporting periods. Due to the Covid pandemic, risks occurred and were mitigated accordingly as described in detail in D1.2.

Task 1.3 Coordination of project meetings and Stakeholder group meetings

A schedule of Work Package Leader and Consortium meetings was agreed and is available on the Our Space Teams Channel. Reminders are sent out a week prior to meetings, including agenda, actions and minutes from the previous meeting. The schedule of Consortium meetings was agreed in advance and adapted throughout the project according to the needs of the consortium.

The Our Space kick-off meeting was held in Cardiff, Wales in December 2018. This initial meeting highlighted changes in the timescale of the deliverables – and these were confirmed and updated with the EU Project Officer.

The project manager has assisted Work Package 2 lead and project partner Climate-KIC to organise the first introductory International Stakeholder meeting in January 2020. This meeting provided successful in engaging our Stakeholders with the project and gaining information from them on how we could improve our reach and outcomes. This is detailed in D2.2 Stakeholder Group Report.

The First-Year review meeting took place in December 2019. All partners sent a representative to attend the meeting and present the outcomes of the work to date and future work. The EU project officer and external examiner reviewed the project and provided feedback and adaptations. These were acted upon and feed back to the EU project officer for approval. All information and presentations are held on the Our Space Teams channel for reference.

The Mid-Term review meeting was held in September 2021, online. Discussions on the delays due to Covid pandemic were explained and work package leaders presented updates on their areas of the project. This meeting was written up as D1.6 Second Interim Report and submitted.

A Final Project meeting was held in May 2022 in conjunction with a partner training day. This was held at the Planetarium, Copenhagen. This event involved each partner training the other delivery partners on the interventions they had developed for use in schools. A proportion of the time was also spent on a 'lessons learnt' activity, to discover how we could improve the project, and what we could take away from the project. Time was also spent on discussing project reporting and content for the Final Review Meeting. A report of the event was captured and made accessible for all consortium on the Our Space Teams Channel and is detailed further in the conclusion section of this report.

Task 1.4 Facilitation of internal consortium communication

D1.3 Our Space intranet was set up using Microsoft Project Online. However, this was then moved to Teams as it was felt this more accessible for the consortium as

a whole. All consortium members have access to the intranet, allowing a secure communication and document storage space. All internal project reports, project deliverables and management documents have been uploaded to the Our Space Teams Channel. All consortium members can store documents in this space to allow collaborative work. Regular email and online communication channel discussions have taken place throughout – coordinated by the project manager when necessary. This was particular apparent during the Covid pandemic when partners in the UK could not meet in person. The consortium also had to increase its online communications during this period.

Task 1.5 Quality management

D1.1 Project Handbook D1.1 was developed. This contains all the relevant information for partners on quality management, project processes and partner responsibilities. This is a living document and is updated when necessary. Deliverables are reviewed by consortium members and stakeholders. A timetable for this process was implemented and is available on the Our Space Teams Channel.

5.2 Work Package 2

Summary WP2

Led by ED, WP2 aimed to collate and share evidence informed methodology to the Our Space Our Future programme. Decisions on the toolkit development, evaluation tools and strategy, and the design of interventions were lensed from this initial literature search, understanding of best practice, research into audience development and the advice of stakeholder groups gathered during WP2. These assets were co-developed across consortium members, with advisory boards and the established International Stakeholder Group, supporting development as well as our engagement at higher levels of policy by allowing more introductions and interactions with key personnel, relevant projects, wider networks and KICs.

Task 2.1 Establishing the Stakeholder Group

The stakeholder groups for each country, and the International Stakeholder Group we established. D2.2 Stakeholder Group Report submitted September 2019 explains this in more detail.

The stakeholder groups have been kept updated on Our Space progress, especially as the Covid pandemic delayed deliveries in schools. Many played a role in online engagements during the lockdown period and supported the dissemination of the project. A key role involved the advisory boards within each country and our

International Stakeholder Group were key drivers within a high-level Lorentz Center meeting (online) where the ecosystem of space industry, education, policy and engagement came together to discuss 'Space Science for Societal Challenges'.

Task 2.2 Communication of new science education and outreach initiatives

ED led partners in building capacity and connections with national and international stakeholders and ensuring Our Space is up-to-date with innovation, progression and new projects relating to science education and outreach. A great deal of this work has been encapsulated in D2.1 Literature Review, and more recently the updated D2.5 Informing the Methodology of Our Space. These deliverables asked the question "What practices truly involve, excite and empower school aged students to feel space sciences are relevant for them?", and brought together published studies and programme reports, shared with consortium partners and beyond.

Work package leaders met to discuss the ways in which the seven principles that emerged from the original literature review (informing toolkit development and delivery activities) could be highlighted throughout the project delivery and dissemination of resources. Consortium partners continued to actively champion these principles in their work with school students and teachers.

Task 2.3 Demographic audience research

D2.3 The Audience Development Plan was submitted September 2019. As the Covid pandemic resulted in the loss of schools, this was revisited by partners to ensure new schools met the criteria. This deliverable ensured that an in-depth and informed understanding of 'underserved' audiences was foregrounded for each region to avoid a scatter-gun, diversity-tick-list approach to schools' engagement. Aspects such as current provisions offered to the schools were also considered to ensure the opportunities of Our Space interventions were placed in the schools where there was most need.

Task 2.4 Review of existing programmes

D2.1 Literature Review, submitted April 2019, produced a scoping systematic literature review that brought together the scientific research and best practice across the European ecosystem of informal and formal space education. The research question addressed was defined as "What practices truly involve, excite and empower school-aged students to feel space sciences are relevant for them?"

This systematic review of primary literature for the Our Space project was updated in April 2021 and used to develop D2.5 Informing the Methodology of Our Space. To date, we have been unsuccessful in publishing in open-source, peer reviewed journals, but this is still an ambition for the project evaluator and WP2 lead to support wider dissemination of the findings that are relevant to a wide range of organisations working within space education and engagement.

To help share the findings we created a short 2m video summarising the results of this work which has been shared on various channels. https://youtu.be/uZH8BDY379U

Task 2.5 Assess the Feasibility of a dedicated Space-KIC (led by C-KIC)

D2.4 Feasibility Study into the Development of a Future Space KIC was submitted in August 21. This report built on outputs and relationships forged at the Lorentz Centre meeting, the relationships developed between partners and their stakeholders throughout the project and wider international space organisations such as EUSPA and DG-DEFIS.

5.3 Work Package 3

Summary WP3

The main features of each task described highlight the coherence of the action implemented by the delivery partners: ED, NUCLIO, PDK, PSC and SMS, following common principles defined and adapted throughout the project. All details of the activities can be found in the website section https://Our Spaceourfuture.eu/resources/ . The WP was led by PSC.

Task 3.1: Student Programme

The project team used co-creation and development for the new student programme (shows, workshops, meet the scientists/researchers with diversity 'designed in', and additional consideration was given in terms of supporting girls and disadvantaged pupils).

The delivery partners developed a dialogue and sharing process discussing working methods, ideas, and content development. This began at the retreat held

in Perugia, Italy in October 2019 and continued throughout the project duration, until our Final Project meeting in May 2022. Despite the pandemic requiring adaptations of choices and strategies to reach students and teachers, the consortium members succeeded to follow the shared guidelines as described in Deliverables D3.1 Repository of Activities, D3.2 Toolkit Methodology Report and D3.3 Our Space Toolkit Outline Report

This approach led to the following outcomes that characterise the set of interventions delivered in the 4 countries:

1. To create a thread that linked together the four interventions centring them around the following approaches
2. To include some method of meeting role models from the Space community and understanding possible career paths
3. To understanding the science and technology behind the jobs in the Space sector, and the future challenges
4. To discover the role of Space in understanding our planet and tackling its challenges (e.g., Climate change)

The interventions also had common education approaches shared by the delivery partners centred on the strong engagements of students and teachers realised through the following actions:

Create opportunities that strengthen a role model approach by interviewing and involving 'space people'. The set of experts ranged from scientists and researchers to industrial professionals. The *meet the protagonists* approach included profiles that are unexpected with the aim of breaking the 'astronaut' and 'super genius' stereotypes sometimes associated with Space.

Use construction workshops and active engagement. The interactive engagement of students and teachers was reinforced through construction workshops that simulated space missions' tasks and challenges, current and future (e.g., Mission to Mars or Space Challenges). Moreover, during shows and demonstrations the active engagement of students from the audience was implemented to ensure they felt empowered to play a key role in the experience.

Use online resources. The use of online tools was a common feature of all the interventions. Some existing tools from previous Space-related projects were adapted and used alongside the new resources developed for this project (see Task 3.5).

Learn soft skills to communicate to your peers what is Space Science and Technology. The interventions also included sessions to train students to repeat autonomously some of the activities presented. This action aimed to reinforce the peer-to-peer approach to communicate contents to others and at the same time to motivate students to better explore and understand contents delivered.

Task 3.2 Family group programmes: encouraging students to share their learning with parents/carers.

While developing the interventions for students the delivery partners also focused on the flexibility of the activities to enable students to repeat autonomously some of the actions with their families. Specifically, construction workshop with simple materials or some of the experiments developed during the shows that could be easily reproduced by the students at home.

A particular focus of the project was on space careers that students can discuss within their family context both autonomously and during the community events (see Task 3.3).

Task 3.3 Teacher CPD: co-development of teacher CPD (activities informed by Space Ambassadors +TDTS + unconscious bias and gender inclusion aspects identified in WP2).

A diverse set of training opportunities were developed by the delivery partners addressed to teachers: 1. involved in the interventions directly with their classes and 2. to their colleagues in the schools involved. Other training opportunities were also developed as part of the outreach actions implemented by the delivery partners and addressed to educators at local, regional, and national levels.

The training opportunities were organised along two main strands:

Ad hoc training sessions to describe how to replicate the interventions implemented in schools. This included instructions to learn how to repeat the activities proposed during the intervention autonomously in the classrooms after the project end. These trainings also strengthened the links between education activities related to Space Science Technologies and STEM education at large. This was a relevant aspect aimed at embedding the space activities in the curricula activities of the schools.

Training sessions included in wider training opportunity about Space and Stem education. The collaboration of the delivery partners with a wide range of stakeholders allowed to propose and include training sessions for teachers online and onsite within the programme of local, national and international events focused on innovation in education, as well as in education on space topics. This action had a double effect: sharing with new teachers, educators and communicators the approach used within the project, and disseminating the results of the project and its potential development.

Task 3.4 Parent and family engagement: development of parent and wider family engagement activities (shows, busking and other hands-on activities, plus signposted resources of ways to extend engagement)

Wider family engagement was developed through Community events organised both online and in-person according to the conditions determined by the Covid pandemic and on the need to reach out to a larger audience.

Community events fell into approximately three groups:

1. School open days online and in-person. These events were aimed at family groups or current or future students. By combining community events with open days, the project partners succeeded to reach two goals: (a) empowering students who took part in the interventions to present to their parents and family community what they did and how they have enjoyed space science and technology, and (b) involving other family groups in discovering how the school community of educators value and use Space related topics to actively engage students.
2. Special events in schools or in the territory. Community events were included in special events organised by the schools in their territory for their community, and for a general audience. In this case, schools reinforced a larger community the relevance of Space topics within the educational programme of their students.
3. Underprivileged areas of cities as well as in the community of Our Space schools. Community events were presented by the delivery partners in special events involving local communities. These community events were performed in under-privileged neighbourhoods. Partners presented Our Space projects and aims and involved them in the activity implementation.

Task 3.5 Online resources: consisting of interactive activities to be used via the website and social media platforms

The online dimension of Our Space aimed to:

1. Devise and implement a collection of resources available through the Our Space Our Future website, including the Our Space Toolkit.
2. Develop a set of activities that can be implemented online within the constraints of the Covid pandemic.

The collection of resources in the Our Space Toolkit includes:

- Descriptions of the schools' interventions and access to their resources
- CPD formats

- Community events presented as recipes/instructions
- Space career resources

The collection was structured according to a co-designed format discussed during the project by all the consortium members and considering observations and field experiences of the delivery partners and our stakeholders.

The scope is to make the resources helpful for teachers, educators and communicators who want to implement a similar format tailored on the local and individual context. These target audiences for the online toolkit can also contact delivery partners if they would like to gain further insights.

Some of the activities described in the toolkit are actions that can be performed both online or onsite (e.g., the space match or space bingo, ask me anything or virtual museum tour). These examples proved how the project team was able to adapt to the constraints determined by the pandemic and to use them to strengthen the online involvement.

Among the other outcomes of this approach, partners formed links with Space experts and professionals world-wide that can be involved again in the continuation of the activities that partners will implement during future educational programmes.

5.4 Work Package 4

Summary WP4

Led by SMS, WP4 focuses on the recruitment of audiences to the school, community, teacher CPD and online programmes, the scheduling of the activities with the various audiences, the delivery to those audiences and the collection of audience data. Included in this work is the management of the contributing partners.

The main objectives of WP4 are:

- To recruit school and public audiences for face-to-face interactions, and to produce appropriate web-based platforms and materials for the project's online programme.
- To ensure that consortium partners who are responsible for this delivery execute the full requirement for the project, to monitor progress and to support these consortium partners in their delivery.
  Consortium partners will build on the resources developed through WP2 and WP3 to provide relevant, timely and targeted delivery materials.

- To monitor progress in programme delivery, ensuring a collaborative climate of sharing best practice and quality assurance among all consortium partners.

Using the information and reflections gathered during processes required in WP2 Audience Development Plan, SMS led the activity of all delivery partners to develop their plans to identify and recruit schools, communities, parents and other stakeholders following the aims of the project and reflecting the needs and special circumstances of their country of activity. A report on all partner plans was issued in m10: D4.1 Progress Report on Audience Recruitment.

In m11 ED, SMS, NUCLIO, PDK and PSC, with contribution from non-delivery partners CU, CKIC and EUSEA, shared specific delivery plans to ensure alignment with project aims, timelines and budget parameters. Delivery partners agreed plans and formats for programme delivery data collection and a data collection tool was developed in m12.

From m14, and in response to the restrictions and difficulties placed by the Covid pandemic, while no changes were made to the principle intended audiences of the project, all partners made changes to their formats and scheduling. The delivery period moved for all partners from m14-32 to m14-42.

Formats were re-imagined for delivery using a variety of methods - online, teacher-led, blended (live and online); partners took advantage of the opportunity to find crossovers and confluences between the audience intervention categories to meet the overall audience plan. These new formats lent themselves well to supporting the impact evaluation data collection delivered by CU and provided fresh opportunities to incorporate dissemination and legacy-building activity delivered by EUSEA and C-KIC.

Some schools were lost from the original recruitment activity at points throughout the project. Partners adapted to this challenge, by recruiting new schools, working with smaller groups, or with fewer schools. Overall, the project worked with 52 schools and 4,741 student participants, against a plan of 50 schools and 5,000 students.

Partners maintained a lively and supportive knowledge-exchange environment through regular meetings (online and – when possible – in person), email and through more informal forums such as WhatsApp groups and #slack.

Intervention data was collected through an agreed format during the development phase and this format remained relevant, useful and accessible throughout the project.

Task 4.1 - School selection, teacher recruitment and programme scheduling (led by SMS)

In m8-10 SMS led the activity for D4.1 Progress Report on Audience Recruitment, with contributions made by delivery partners. This report was issued in m10. The report includes lists of any schools or community events recruited or planned and intentions regarding student age groups, event style and networks used. All delivery partners made a clear plan for the recruitment of participants in all categories during this period.

As a direct result of the restrictions placed on each country – for partners, in schools, for students, teachers and for their wider communities – of the Covid pandemic, significant changes were made by each partner to the scheduling of interventions and – to a lesser extent – to the schools participating in the project.

Schedules - the first Covid lockdown coincided roughly with the originally planned start of partners' delivery (m18). Partners met regularly and as regulations allowed to discuss plans to reschedule. Plans were revised several times, according to restrictions easing in each country, and halted again as subsequent lockdowns occurred. Naturally, this led to great variety in scheduling across the partners, with no single plan for all. Ultimately, the delivery period moved for all partners from m14-32 to m14-42.

School recruitment – although partners worked to support teacher contacts to remain on the project throughout the Covid period, some schools were lost from the original recruitment activity due to restrictions placed on interacting with schools or due to the general pressures placed on teachers to manage the day-to-day requirements of their students. Partners experienced varying ability to recruit new schools but endeavoured to recruit as per the agreed approach defined in D4.1 Progress Report on Audience Recruitment.

A full list of participating schools and details on reach by audience is reported in D4.3 Summary Report on Delivery Programme.

Task 4.2 - Content delivery (led by SMS)

Task 4.2 stated that consortium delivery partners (ED, NUC, PDK, PSC, SMS) would deliver a face-to-face programme to student, teacher and public cohorts, with a four-intervention structure for students in school. These two aspects - face-to-face interaction and multiple intervention remained key principles in raising aspirations in STEM in the Our Space Our Future approach. Although these principles were at risk of greatest erosion in the project due to Covid restrictions, the consortium agreed that these should remain as pillars to the format of the student interventions wherever possible.

As it became clear that in-person, face-to-face interaction would become impossible at times and for some schools, partners experimented with alternative delivery formats. Each partner worked to adapt the formats developed through their WP3 endeavours in order to serve audiences in a Covid environment.

A combination of online, face-to-face and blended delivery methods were employed, with a switch back to face-to-face, in-person events towards the end of the delivery period as restrictions eased. Schedules were pushed back by partners to as late as possible within the project to allow this.

As is expected during a period when face-to-face activities have been greatly restricted and a switch to online has been needed, online engagement data has far exceeded plan, while Teacher CPD and community involvement has underachieved. Partners have provided ample evidence at their regular update meetings of the challenges faced by schools in each country to engage with these aspects of the project.

Details of the formats developed and ultimately delivered is reported in D4.3 Summary Report on Delivery Programme.

Task 4.3 - Co-ordination and management the Programme Delivery (led by SMS)

In m11 SMS led discussion, along with ED, NUCLIO, PSC and PDK and including non-delivery partners CU, C-KIC, EUSEA and guest experts from schools, relevant industry and support organisations to share specific delivery partner plans with a view to ensuring the aims of the project are met and the parameters of time and budget are fully reflected in those plans.

Resulting from these meetings, delivery partners consolidated thinking on next steps for content delivery and agreed on a format to collect data on all schools. Data on schools, contacts, student groups and numbers, community events and their attendance numbers and audience types, regional partners/industry will be recorded on a shared document. This document 'Programme Delivery Data' was produced in m12 and uploaded to the Our Space SharePoint and received contributions from all partners. This format remained relevant, useful and accessible throughout the project and is used to report in the D4.3 Summary Report on Delivery Programme.

Partners met regularly throughout the project (online and, when possible, in person), and exchanged plans and ideas through email and through more informal forums such as WhatsApp (individual and group) and #slack. These regularly exchanges supported the consortium in creating opportunities to incorporate

dissemination work of EUSEA and the legacy-building activity of C-KIC into the core delivery activity.

Delivery partners worked closely with CU to issue and collect data on impact, where possible delivering audience focus groups with the coaching support of the evaluation lead.

5.5 Work Package 5

Summary WP5

WP5 is led by CU with direction from an external evaluation expert and with input from all delivery partners in the project. The purpose of this work package is to develop and implement an evaluation framework to measure the impact and change generated by the Our Space project on student, teacher and public audiences. Results from WP5 are reported at key timepoints throughout the project and will detail areas of good practice, identify key challenges and inform the sustainability and legacy of Our Space.

Task 5.1 Literature Review based on Current Knowledge and Best Practice

This task involved working with ED and fed directly into D2.1 Literature Review. The review provided guidelines and recommendations for the Our Space delivery protocols and informed the evaluation strategy for WP5. Conclusions from the literature review were:

- Get hands-on with real science skills
- We should not 'design for' or 'do to'; we should 'work with'
- Celebrate success and bring in the wider family and local community
- Keep engagement careers-focussed
- Apply a whole-school approach to engagement
- Build in programme legacy

Task 5.2 Development of an Evaluation Strategy

The Our Space evaluation strategy was presented in D5.1 Evaluation Framework Report. This strategy was implemented in all five delivery countries (Denmark, England, Italy, Portugal and Wales) in order to explore and measure the impact of Our Space on its student, teacher and public audiences. Development of the evaluation strategy was iterative: input and feedback was obtained from the external evaluation expert, from the consortium and from our international

stakeholder group. The final evaluation strategy involved both quantitative and qualitative approaches to data collection. The strategy comprised five attitudinal areas that were targeted for impact, these were mapped against a series of generic learning outcomes.

Task 5.3 Produce an Evaluation Toolkit for Delivery Partners

A separate evaluation toolkit was developed for each of the Our Space audience groups: students, teachers and public. The toolkits were developed in parallel with the evaluation strategy and framework and the data collection instruments. Each toolkit provided guidelines and instructions for delivery partners on how to implement the evaluation protocol in their country. This included guidelines on inviting participation, obtaining consent, implementing data collection instruments and sending all data to Cardiff University for storage, analysis and reporting. These toolkits are stored on the Our Space Teams Channel.

Task 5.4 Deliver Training Workshop to Delivery Partners

The three evaluation toolkits provided the foundation of the evaluation training that was delivered to all delivery partners at the Our Space retreat in October 2019.

Task 5.5 Design Evaluation Forms (data collection tools)

All data collection forms were developed and translated for implementation. All forms were available in paper and online formats in order to coincide with different mediums of delivery. Data collection tools included:

Students	Pre- and Post-intervention Surveys Focus Group Question Schedule Delivery Partner Feedback
Teachers	Surveys
Public	Graffiti Walls / Mentimeter Survey/Poll Delivery Partner Feedback

Data collections tools were largely informed by existing instruments that had been previously implemented with similar audiences. However, these needed to be tailored to the aims and objectives of Our Space. All data collection tools were reviewed by the external evaluation expert and by the consortium before finalising.

Task 5.6 Collect Data from Schools at Key Points Throughout Project

Student data was collected at two key time points:

- Baseline: before any Our Space interventions had begun
- Post-interventions: after all interventions were complete

Students completed a survey at the baseline and the same survey again after interventions. A sample of students in each country also participated in a focus group after interventions. We obtained 2,966 baseline student surveys across 50 schools and 1,380 post-intervention student surveys across 38 schools. Results from the student baseline surveys was reported in D5.2 Pre-Intervention Evaluation.

Data collection from teachers had to adapt in response to the Covid pandemic. Where we had initially intended for teachers to complete an 'immediate' survey at the end of their CPD event and a 'follow-up' survey, three to six months after the event, due to delays in the delivery timeline, most partners could only collect 'immediate' surveys. We collected 75 'immediate' surveys across the five consortium countries and 13 'follow-up' surveys from teachers in Denmark.

Task 5.7 Produce End of Project Report (D5.3)

Deliverable 5.3 Final Evaluation Report has been reviewed by the external evaluation expert. This final report details the impact of Our Space on its three audience groups: students, teachers and public. It provides both quantitative and qualitative data, provides detailed examples of good practices, the challenges of the project and will inform the sustainability and legacy of Our Space.

5.6 Work Package 6

Summary WP6

EUSEA leads WP6 and is responsible for maintaining and implementing the Our Space Our Future Communication, Dissemination and Exploitation Plan. WP6 facilitates the dissemination tasks of all Consortium partners, helping with their communication needs and supporting them in creating any required publicity materials. Online presence, including social media channels, website and other forms of communications, have been part of the developed work.

Task 6.1 To Implement and Monitor the Communication, Dissemination and Exploitation Plan

In March of 2019, EUSEA submitted D6.1 Communication, Dissemination and Exploitation guidelines for the Our Space project, detailing the processes, steps and tools that would be utilised by the project for effective and engaging communication of the key project messages, as well as the target audience groups for which the project hoped to reach through its communication efforts.

A major tool of the Our Space project communication with external audiences has been through the Our Space social media platforms and the project website. Key project information and resources have been made available through these channels.

The aim of the project's social media program was to create a far-reaching campaign that engages 35,000 students and the wider public, to maximise project reach.

	Our Space Social Media Channels							
	Facebook reach	Instagram reach	Twitter reach	Our Space YouTube channel	Our Space Website users	Online events (not including school, CPD or community events)	Partners Our Space social media	Total
Numbers	77,797	25,243	507,022	9,219	10,305	3,991	126,926	760, 503
	610,062							

EUSEA has focused its attention across multiple social media platforms, including Facebook, Instagram and Twitter, all which have a different user demographic. Through these combined efforts a total reach from social media channels is 610,062. This number increases if we add our audiences from YouTube, the website, partners online social media channels and online events to reach a total of 760,503.

Website analytics data show that between December 2019 and April 2022 10,305 unique users had visited the site, corresponding to 26,380 sessions.

Our Space Our Future Brand Guidelines were made available at the start of the project, for the consortium to use in reports, documents, presentations, flyers etc. Using these guidelines EUSEA has created a collection of promotional materials to be used to promote Our Space Our Future key events and results.

Task 6.2 Maximise Dissemination and Exploitation through Stakeholder Groups and Outreach Activities

The Our Space Our Future project has created a strong network of experts: Our Space Consortium members participated in almost 60 national and international outreach events - conferences, panels, working groups - to reach a large range of target audiences and stakeholders from the fields of space science education and communication. These have included:

1. NUC and CU teams presenting at the Global Hands-On Universe conference in 2020 and 2021.
2. Workshops at EUSEA 2020 online conference on Space careers led by SMS and NUC.
3. Co-organisation of a workshop on 'Space Science for Societal Challenges' with SpaceEU led by ED, C-KIC and CU.
4. PDK presenting at the Big Bang and Science Expo.

Our Space partners have reached 105,947 individuals including but not limited to audience groups consisting of the general public, researchers, educators, policy-makers and school pupils through online and in-person events.

Throughout the timeline of the Our Space project, partners worked with a number of external stakeholders and collaborators who have interfaced with the project and helped support the outreach of the Our Space project. The number of external collaborators is 72 and come from a range of organisations including education institutions, space sector organisations and industry. More details can be found in D6.3 Report on outreach activities.

Location of the stakeholders that have supported Our Space

Task 6.3 Creation of a Long-term Sustainability Action Plan

Led by C-KIC, the activities related to this task began by reviewing the different deliverables of the project and selecting which of these elements could be

sustained after the official end of the project. All project partners engaged with a focus on those that are directly involved in the development of these tools.

As part of the research for Deliverable 6.5 Sustainability Action Plan, C-KIC has organised two activities. The first activity took place in October 2021 and consisted in a collaborative workshop hosted on the platform Miro. The session's aim was to understand the consortium's position towards project sustainability, and to further investigate the legacy of the Toolkit. The findings of the workshop were summarised and shared with the consortium in November 2021, and partners were asked to take action on the actions raised. The findings were also incorporated in D6.5 in a section regarding the sustainability of the project, and of the Toolkit specifically.

The second activity took place in March 2022 and consisted of face-to-face online interviews with each delivery partner (SMS, ED, PSC, NUC and PDK) aimed at addressing the sustainability of the project after the end of its lifetime. During these interviews, data was gathered from each interviewee, and three legacy scenarios have been developed and discussed at the Copenhagen final meeting in May 2022. At the project meeting, it was observed that all 3 scenarios present significant pros and cons, it was agreed that choice of one of them would ultimately depend on the willingness of each partner to continue a collaboration, as well as on the revenue streams available to ensure financial sustainability.

6 PROJECT REFLECTIONS

The vision of the Our Space Our Future project was one where all students regardless of ability, gender, socio-economic status or prior school achievement, could gain an understanding of the diversity of careers available to them in the space industry. As a highly experienced delivery team with many years' experiences of delivery to diverse school audiences we knew as a consortium that the best possibility of achieving this was to visit students' face-to-face multiple times to build a sense of trust and to bridge the gap between 'expert' and student. Our project plan was based firmly on our previous findings and observations, and this opportunity to work intensively with students and conduct a rigorous evaluation of what works effectively was incredibly motivating for the consortium. Though no-one in 2018 could have foreseen the changes that would be required due to the global pandemic, it cannot be overstated that the adaptations that had to be made meant we were not able to thoroughly test the model in the way we had intended and hoped.

The struggle to maintain schools and teachers to allow continued intervention at a time when they were desperately surviving with lockdowns and home-schooling created a very different relationship to the one that we would have hoped to build. As lockdowns eased towards the end of our extension, those partners who were able to resume in-person visits got to see a flavour of what could have been. Students and teachers were suddenly engaging and enthusing about the potential of the project, just at the time we came to the end.

Disappointing though this was, the consortium and delivery partners particularly did all they could to support students and teachers with things as close to the original interventions as possible. In addition, some benefits to the move to online provision were seen as all delivery partners began to understand the potential for more role model/industry link ups via remote/video link than perhaps could have been arranged in person. The requirement to capture some of the science shows on video means they are now available as resources for further use, when this was not originally part of our toolkit plan. The skills to adapt to engaging on camera and online were greatly accelerated due to the needs of this project and this is now a skill all delivery partners have gained for further use. This has been an unexpected legacy of Our Space.

The evidence-based work completed early on in the project has also provided great value to all delivery partners who rarely have the resources to do academic review to support the pedagogy of their work. The findings of the literature review and the

benchmark and post-intervention data will be used intensively to support future work and to leverage further funding.

The relationships and shared learning across the countries through the co-creation and sharing of both successes and challenges has rewarded all partners with significant learning from each other and our shared values around the social goals of the project have continued to unite the group to continue even when things sometimes felt demoralising. The strength of the consortium at the end of such a challenging project should be recognised as a success, and we hope to continue working together in a number of ways.

A Final Project meeting was held at the Planetarium, in Copenhagen in May 2022. This meeting aimed to allow Delivery partners – ED, SMS, PSC, NUCLIO, and PDK to demonstrate in-person some of the activities they had delivered to schools, at community events and at teacher CPDs. Although, the planning and development of these activities had been discussed and worked on together as a consortium, the pandemic meant that most development collaboration could only take place online. The main aim of this learning experience was for each delivery partner to share in more detail one of their four interventions so that the other four partners all gained additional resource for future educational work. Sharing and reflecting on how the interventions had worked, especially those that were adapted to an online format brought about discussions on their effectiveness in engaging with audiences – and how those that worked well could be used for other projects, adding to the legacy of Our Space.

Partners were asked to share what they had learned from their own interventions and then reflect on what they had additionally learnt from each other at this key event.

What did you learn from your own interventions that you would like to share with others?
"How to use space science between interventions and the curriculum"
"The importance of linking the space industry to everyday benefits for society"
"Repeated interventions with same students have enormous potential to allow students to open up & engage more actively & confidently"
"The power of using different careers people in school sessions as long as they are the right people with a good facilitator.

Sample of responses from partners about what they learnt from their own interventions.

What did you learn from the other partners today and how will you use it in your future work?
"Almost any demonstration can be used to highlight an aspect of space science. Thanks SMS for bouncing balls & asteroid impact avoidance /DART link."
"The importance of training the teachers (NUCLIO) to deliver activities"
"Airlock (PDK) challenge's opportunities for team work and creativity"
"I personally loved the Space Bingo (PSC) and the possibilities it has. Also loved the simple activities that can be done with daily materials to explain complex concepts and how strongly they can engage the students."
"That curiosity at the heart of learning (ED) is such a good starter to engage all types of people.

Sample of responses from partners about what they learnt from each other at the end of project training session. (Partner responsible for each idea shared is given in brackets.)

It was also felt that each delivery partner had made connections with stakeholders working in the space sector and that some of these connections would remain for future support in other projects. The use of these diverse real life role models was considered a huge benefit to the project in demonstrating that 'Space is for all'. As well as delivery partners demonstrating some of their activities to the consortium, this meeting allowed the project team members to reflect on their experiences of Our Space and determine how activities could potentially be used or adapted to improve them further. The multiple intervention approach was a factor that all

How will you use what you learnt today with others and how will you use it in your future work?
"New online resources and the use of technologies to engage students"
"The importance of training the teachers to deliver the activities"
"I have learnt more about how to alter approaches to try and capture the attention of multiple audiences"
"Back to basics – that curiosity is at the heart of learning and is such a good starter to engage all types of people"
"Use of simple, all inclusive participation to engage audience"

agreed supported the outcomes of the engagement with the students, and when possible, would repeat this methodology in future projects.

A section of the meeting was dedicated to the sustainability of the project, presented to us by Climate-KIC as lead. Online meetings had taken place in regard to this report, but a wider discussion took place in-person and added to the content for the final report. The main points of these discussions were around the three possible models of governance for any future work, and what would be required to help make that happen.

Each delivery partner has begun to meet with potential national partners/funders and discuss how the learning and outcomes of Our Space can be used.

In Wales, for example, a recent event at the Senedd (Welsh Government) highlighted the excellent science being done in Wales and 'Our Space Our Future' was invited to exhibit. Three ministers who had schools in their constituency expressed interest in organising a school visit to find out more about the project and the impact on students, and a question has been tabled to ask to the First Minister about how the Welsh Government can support the continuation of the work due to the uncertainty of the UK's future involvement in EU funding.

In England, Wales and Italy, discussions are also being held around how the toolkit materials and evaluation findings can be shared throughout the ESERO community of space educators.

This level of support could not have been possible without the funding from the EU to bring together this consortium of outreach organisations and academics to create something that seems, in many ways, bigger than the sum of its parts.

7 CONCLUSION

Our Space Our Future began with a vision to inspire a new and diverse generation of young people across Europe to consider a career in the space industry. Working with almost 5000 potential recruits across five countries our research has shown significant shifts in student attitudes about the relevance of space science to the environment and to everyday life. The students we reached are still 5-10 years away from making any definitive career decision so the monitoring of long-term take up from this cohort is not possible. However, evidence has shown us that this is a critical age for shaping your 'possible self' and building confidence in the possibilities ahead. By choosing to tackle the typically under-represented audiences we took on a challenge beyond just preaching to the STEM converted.

The biggest changes in attitudes shown were around how 'discoveries in space science make our lives easier', an awareness of the diversity of those working in the space industry and increases in the enjoyment and interest that were self-described by the students for these subjects. From a low benchmark there was also a significant increase in students who said they were 'clever enough to work in the space industry'. This is a huge achievement as the stereotype shown with our data and elsewhere is often that you have to be top of the class, super clever to work in this kind of job.

As with many studies of this type it was harder to show a change in terms of definite intent to have a job in this industry. Some of the reasons given are still around the perception that working in space means 'danger' and 'working away from home, leaving your family' etc. This is a useful finding that backs up some previous research around jobs in STEM and suggests that this message about work life balance and typical working days should perhaps become more centrally embedded in the messages from the role models, just as much as the excitement and passion they have for their work.

The multiple intervention methods we have used, the involvement of communities, teachers and parents, and the data collected has already created a high level of interest amongst stakeholders in the Space sector and beyond. It is rare for outreach projects of this kind to include such rigorous evaluation, and this will continue to build the Our Space legacy beyond this initial phase of funding.

Despite the sadness of having to adapt from our original face-to-face plans, we feel we have achieved many of the stated goals to a high standard. We are highly motivated to try and secure some further support to allow us to continue with the work and deliver in the way we had originally intended at some point in the future. The production of the many supporting resources such as the toolkit, the space scientists' interviews, the sector webinars and even the diverse space scientist gifs

will continue to be shared widely across the sector and have a legacy for many years.

The project set 21 Generic Learning Outcomes, and we achieved a positive effect in 19 of them which represents a significant achievement against the pandemic backdrop and adaptations that had to be made. To have had such a positive effect on young people against the huge changes that were happening in their worlds at the time is a testament to the effort and passion put in by all the consortium members. The last word should go to one of the teachers we worked with who summed up why the goals of the project were important to them, and how he felt they had been achieved.

"I think the way that the ambition of working within the space sector did open up to them, I don't think they realised that actually…So, I think it broke down the misconception that somehow it would be accessible, because there's a range of different work you can do, other than being an astronaut."

8 APPENDICES

Appendix 1 Annex 1 Project Review Report RP1. Responses to Reviewers Report

General Comments

We would like to request deadline extensions for Deliverable 3.1 and Deliverable 5.2. Justifications can be seen in this document. A formal request to the EU has been made for the deadlines to be extended for both these Deliverables. We would like to remove D6.2 and include this information in D6.1. A formal request has been made. We also want to make Deliverable 6.1 public.

Work Package 1

The Interim Report, D1.4 was based on the template for the Periodic Report that was due on 31st Jan 2020. We believed this reporting template was sufficient to use as our Interim Report, and felt we had added, explained and demonstrated all the main objectives achieved in the project to date. We will ensure our next report is more comprehensive and includes detailed reflection and, also areas for further development, as suggested by the reviewer. All deliverables are submitted to a two-tiered peer review – but we have taken into account the reviewers' comments and have updated our internal proofing and reviewing procedure. As documents are reviewed internally then this allows challenges to be made within the team. However, now that our International Stakeholder group and Advisory Boards are functioning, we intend to use their expertise and skills to review our reports and provide a more robust feedback. This will be particularly important as the Deliveries to schools are beginning this year.

Work Package 2

Deliverable 2.1

The Literature Review will be thoroughly reviewed, checked for spelling and grammatical errors and corrected to ensure it is fit for external dissemination. The corrected and fully proofed version of D2.1 will be ready for resubmission by **31st March 2020**.

As D2.1 is a Literature Review that focusses on aspects of space science education that are specifically relevant for Our Space Our Future evaluation and toolkit development, it remains as the best version for this point in time for the project. Nevertheless, with input from the wider consortium and advice from the international stakeholder group, WP2 will be providing an additional deliverable which will be a publicly accessible update to the Literature Review. This will also accommodate the suggestions from the reviewer such as wider research of other EU funded space education projects, inclusion of wider, relevant learning from the arts education community and consideration of research by Education and Employers, the Careers and Enterprise Company and other repositories for relevant source material, as per reviewers comments. A formal amendment for the additional Deliverable will be requested in **February 2020**. The submission date of this additional deliverable would be **31th July 2020**.

Work Package 5

Deliverable 5.1

In response to the feedback, we will make the following amendments and resubmit Deliverable 5.1 on **31st March 2020**.

We will provide a clearer and more detailed explanation of the evolution of the evaluation strategy and sources of influence. More specifically, the deliverable will be updated to specifically explain how the evaluation strategy was informed by a number of sources and the added value they provided. This includes the project aims and objectives, the literature review, the evaluation consultant (Jen DeWitt), outcomes from previous initiatives, input from the consortium and input from the international stakeholder group that were formally introduced in January 2020.

We will include details on the piloting process of the student survey and also the advice received from a special educational needs and disabilities (SEND) specialist teacher on adapting data collection techniques to be more accessible to these students.
The teacher survey has been reformatted, so the more 'personal' questions are at the end of the survey rather than at the start.
The terminology issue has been resolved and we are using the term 'space science' or 'space science industry' when specifically referring to careers. This decision was based on several reasons. For one, space science is the phrase used in our overarching vision and objective of the evaluation framework set out in our original proposal. This terminology will also allow for comparisons with existing literature and previous initiatives, e.g. Space Awareness. Where we have piloted this terminology with a group of students akin to the OurSpace cohort, Space Awareness also demonstrates the compatibility of this language with a comparable cohort.
Nonetheless, we appreciate that this terminology, as with any other, is not necessarily straightforward in terms of translation so we have advised delivery partners to use their discretion. However, we have emphasised the importance of gathering comparable data from partners so have encouraged partners to stay as close to this term as possible.
We will place greater emphasis on how the evaluation approaches will support the legacy of OurSpace and will provide case studies and examples of good practice to practitioners, teachers and future initiatives, thus extending our impact beyond that of the OurSpace timeline and its immediate audience.
The online annex accompanying this deliverable will be updated to include the final versions of data collection materials.

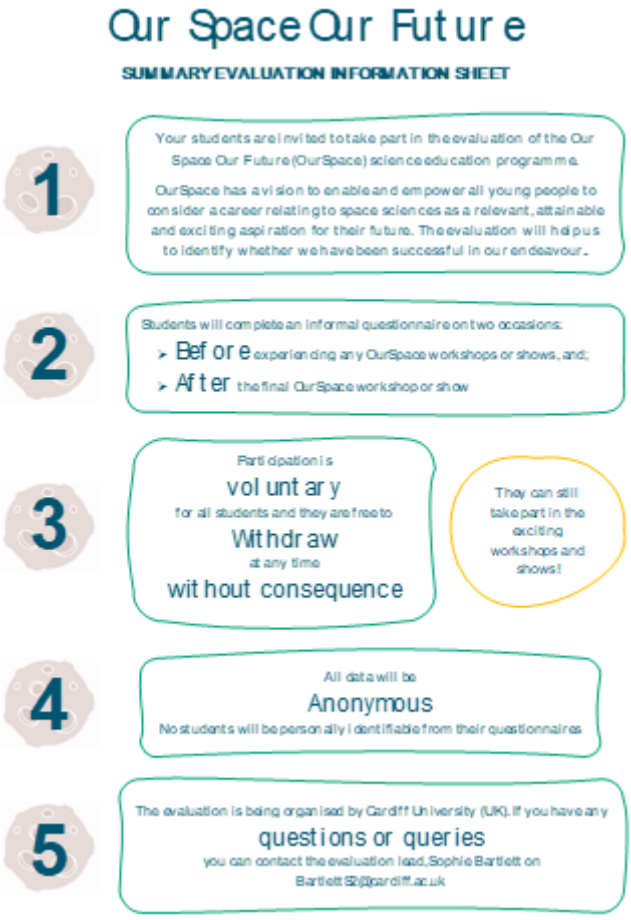
Work Package 6
Deliverable 6.2. We have requested that Deliverable 6.2 is removed and included in Deliverable 6.1 – the Communication plan, dissemination and exploitation plan. Work Package 6 related to the communication plan, dissemination and exploitation plan led by EUSEA. As we have updated D6.1 we wish to re-submit this Deliverable. The plan sets out a schedule that at the end of each year feedback on project communication will be collected from project partners and the Consortium will reflect collectively on what has been effective and what can be improved. Project communication is collected from partners on a regular basis during the online meetings. We will instigate a written poll to monitor internal communication and hold a feedback meeting once we have obtained the monitoring results.
Deliverable 6.1 was written based on EC documents including "Making the most of your H2020 Project", and previous communications plans developed by EUSEA or in projects we participated in. We have taken note of the reviewer's comments and teachers will be approached in a more active way via the local teams and local social media managers. We will show the progress of this work once it starts.
As noted earlier, we will use a more thorough grammar check and reviewing procedure for our Deliverables.
In answer to a specific comment about the wireframes, these were fully developed, and an expanded explanation is provided on the revised Communications Plan.
The timeframe for the production of a dissemination website did not consider a "testing" phase with the different audiences. That would imply an important amount of work that was not planned for. We believe that the feedback provided by the different audiences to the partners on-site, while developing their interventions, will bring relevant inputs for the website's future adaptations. We are open to making the changes that this feedback might bring about. The website follows the standard of information delivery for different kinds of visitors. As this is our first year, we realise we have little original content to share. As deliveries to schools proceed, we will update the contents once our deliverables become public and once the partners report on their local actions. Formatting of the website has been improved to ensure there are no misunderstandings with some sentences written in bold, to highlight them. They were not meant to be hyperlinks so were not broken as suggested but we acknowledge this was misleading. The bold sentences were changed.
Our online presence is ambitious in terms of numbers. We have recruited local social media managers from each partner organisation for the implementation of the strategies, especially at a local level, in a way that resonates with the local contexts. We believe this will increase our interactions. We are aware that our social media engagements are low at presents but this number is increasing on a daily basis and considering that the project hasn´t deployed its interventions with its final target group, we are positive we will see a steady incremental increase. We acknowledge the ambition of the twice-

yearly review. To make it more realistic and actionable in the timeframe of the consortium and its partners, we will run this overview on a yearly-basis and EUSEA will collect the information.

Deliverable 6.4. We are revising the Data Management plan, taking on board the advice provided by the Reviewer. We will put into place a more structured and formal review of our internal project communication between consortium members and our external communication. This is described in the revised D6.4, submitted on **20th Feb 2020**. Evaluation requests for consent have been updated to take into account students of different literacy levels and are described in D5.1 – due to be submitted 31st March 2020.

Work Package 7

Deliverable 7.2. It was highlighted in our review meeting in December 2019 that the information sheets provided to students, teachers and parents around the evaluation process are very text heavy and could be more aesthetically appealing to the audience so as not to deter them from participation.
The current information sheets are based on a template provided by Cardiff University around what information potential participants should be provided with to ensure full transparency. It is this information that Cardiff University base their ethical approval on. Consequently, we are limited in how much we can amend these without losing our approval. However, as a compromise we have produced some additional 'quick sheets' for students, parents and teachers.
The quick sheets cover the key aspects of what participation in the evaluation will involve and should potential participants have any further questions or seek additional information, they can refer to the full information sheets. The quick sheets are just one page, with minimal text. An example is shown below.



Delivery partners will also be fully informed on what information is crucial in communication with potential participants. Delivery partners will liaise directly with Cardiff University partners to ensure ethical protocol is followed.
We hope this approach is sufficient in meeting the recommendations provided by our reviewer.
Deliverable 7.2 has been updated and the Deliverable re-submitted on 12th February 2020.

End of Report

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