Discover the Cosmos Deliverable

D4.4 Final Report on Implementation Activities (Local Level)

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Short Description:

This report documents the implementation activities of Discover the COSMOS undertaken at local level throughout the second year of the project (1/9/2012 to 31/8/2013), as they have been described in Deliverable 4.1. This deliverable is best read in conjunction with the interim reports on national and international level implementation activities.

List of Recipients: Discover the COSMOS participants

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1. Introduction

The Discover the COSMOS (DtC) educational approach aims to demonstrate innovative ways to involve teachers and students in eScience through the use of existing e-infrastructures in order to spark young people's interest in science and in following scientific careers. Attracting students' attention by presenting contemporary ideas and by offering activities that are closely related to new technological achievements and everyday life is one of the keys to stimulate students and contribute to the discovery of the next generation of innovators.

Students are always fascinated by cutting – edge experiments and are eager to find out as much as they can about them. Activities that involve such ways of innovative experimentation, give students a chance to witness first-hand how experiments are performed and how data acquired by these experiments are studied in order to come to conclusions and theories that are scientifically correct and verified. This way of introducing science helps students overcome the idea of it being complex and too difficult for them to understand and helps them to see it as a tool to explore and understand nature. Thus, in order for the consortium to demonstrate how Europe's e-infrastructures could provide powerful tools for scaling-up current pilot implementations for effective introduction of eScience in the school curriculum a series of eScience initiatives that are offering access to large research infrastructures (telescopes, accelerators, particle detectors) have been designed following an inquiry based methodological approach. These initiatives include teacher training activities as well as a variety of other awareness raising activities such as masteclasses, e-masterclasses, virtual visits to the ATLAS control room at CERN, summer schools, science contests, science fairs and hands-on workshops.

In order to organize these implementation activities in an efficient way, the consortium has divided them in three categories based on their scale: local, national and international. Within this document we report the local level implementation activities that took place during the second year of the project, from September 1st, 2012 to August 31st, 2013. The local implementation activities include demonstrations and training workshop activities in schools and teachers training centres as well as eScience school-based activities. Furthermore, it should be noted that during many of these training workshops, teachers had the opportunity to get familiarized with the proposed approach and exchange ideas and experiences with experts and teachers trainers.

Table 1 provides a summary of the most important local level implementation activities undertaken by the Consortium partners during the aforementioned period. All activities are listed in the Annex.

Title of Activity	Type of Activity	Date(s) of Activity	Number of Teachers and Students participated	Participating Institute(s)
MiniMasterclasses / Virtual visit to ATLAS Control Room (CERN)	MC	November 2012 – May 2013 (13 events)	143 teachers, 381 students	IASA, CERN, EA
NTW National Masterclasses in astro-particle physics	MC	September 2012 – August 2013 (6 events)	6 teachers, 150 students	TUD
German National Masterclasses in Particle Physics	MC	September 2012 – August 2013 (75 events)	75 teachers, 1875 students	TUD
"Setting references when everything moves" workshop	T	September 2012 – July 2013 (17 events)	10 teachers, 250 students	UCM
Masterclass for Y12 students	MC	December 2012, February 2013, April 2013 (4 events)	13 teachers, 182 high school students	UB
"Discover the COSMOS at schools" workshop	T	November 2012 – June 2013 (11 events)	73 teachers, 880 students	NUCLIO
"Hunting Asteroids" workshop	T	September 2012 – July 2013 (4 events)	19 teachers, 50 students	LJMU
Discover the Cosmos @ the Observatory	T	March 2013 – May 2013 (6 events)	18 teachers, 305 students	UoC
Conhecer o Universo workshop	T	November 2012 - May 2013 (6 events)	24 teachers, 222 students	NUCLIO
MC=Masterclass; SS=Sumer School; T= Training Seminar or Workshop				

Table 1: Local level activities implemented for Year Two of the Discover the COSMOS Project

2. Local Level Implementation activities

2.1 MiniMasterclasses / Virtual Visits to CERN (IASA, EA)

Following the model of Hands on Particle Physics Masterclasses, a series of virtual collaboration activities, called mini-Masterclasses were designed and implemented, promoting inquiry based and problem solving processes in virtual and blended learning environments. In this case students performed the assigned tasks from their schools. The mini-Masterclasses include a presentation of the rational of the CERN experiments, a virtual visit to the ATLAS Control Center (real time connection with CERN) and a discussion with the researchers (Greek researchers) on shift, and the "hunt for Higgs" challenge by using real data from the ATLAS detector and analysed with the HYPATIA educational tool.
The first of these events organized by EA and IASA took place during year 1 on the project (April 4th, 2012) and was very successful. Following the dissemination of that event many Greek schools were interested in participating in a similar 1 –day activity. Thus, a series of mini-Masterclass events were planned resulting in 13 similar activities in various schools around Greece. The impact of this educational activity in some schools was so great that some teachers planned a few months later a field with their students at CERN!
As such case we present the Yannopoulos School - a private educational institution covering all levels of K-12 education located in Glyfada, a suburb at the south of Athens (Greece). The school employs innovative instruction methods coupled with advanced ICT designed to ensure a rich learning experience for its 200 students. The virtual visit to the ATLAS control center offered a unique opportunity to all students and staff to get a first concrete idea of the huge scientific effort at the ATLAS experiment at LHC before the field trip that followed a couple of months later.

The virtual visit was combined with a hands-on Masterclass organized by physicists from the University of Athens, in which students learned how to use the HYPATIA online applet to search for Higgs-like events in real data from the ATLAS experiment. A video showing scinetists Stephanos Leontsinis and Georgios Iakovidis in the ATLAS Control Room and students of Yannopoulos School in Glyfada is available here: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Glyfada-2013.html#sthash.GsE9GtuB.dpuf

Details from all virtual visits of the rest Greek schools can be found on ATLAS webpage (under years 2012 & 2013):
http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2012/PastEvents.html

The specific link of each Greek school that implemented the Discover the COSMOS miniMasterclass and also performed a virtual visit to the ATLAS control room can be found in the ANNEX 1.1

Figure 1. Students from the Yannopoulos school of Athens (below), had the opportunity to perform a virtual visit to ATLAS control room and to get a firsthand experience on how a CERN experiment works and engage in a Q &A session with two CERN scientists (above) of Greek descent (S. Leontsinis & G. Iakovidis).

2.2 German NTW National Masterclasses in Particle Physics & Astro-particle Physics (TUD)

Tracking the Big Bang: With 'Netzwerk Teilchenwelt' (Network ParticleWorld) one can experience particle physics and astro-particle physics within one's reach. During workshops in schools, school labs and museums all over Germany, young people and their teachers enter the world of quarks, electrons and company (Figure 2).

Centerpiece of the German network are more than 100 one-day-workshops in a year at schools, in school labs and other institutions of education: Guided by young scientists, young people provide data measurements from LHC in real-life conditions like physicists do and explore the fascination of modern science. Throughout the country, young particle physicists, being mobile experts, are on the road to host “masterclasses” in schools, museums and other institutions of education.

‘Netzwerk Teilchenwelt’ not only provides accelerator physics, but also experiments with cosmic particles. Using detectors such particles permanently reaching earth from space are getting visible. Young people and teachers also can take action at authentic locations: The Network

offers workshops and project weeks at CERN and the possibility to collaborate actively at German research institutes.

The program is run by the IKTP at TU Dresden, funded by the federal ministry of education and research (BMBF) and under the patronage of the German Physical Society (DPG).

From the period 01/09/2012 to 31/08/2013, 75 workshops have been implemented around Germany. The number of teachers participating in these activities was 75 while the number of students is about 1875. Figure 2 illustrates all locations around Germany as well as the number of the local masterclasses performed in each area.

Figure 2. *Map of Germany showing the number of local masterclasses performed in an area (W stands for workshops). Within the second year of the project (1/9/2012-31/8/2013), 75 masterclasses were organized reaching out to 75 teachers and approximately 1875 students (participants).*

Source: http//www.teilchenwelt.de/actuelles/termine

2.3 Astronomy related activities in the UK (UoG, LJMU, UCAM)

During the second year of Discover the COSMOS implementation phase (from September 2012 to August 2013) there were many activities organized in the UK. The most popular in terms of times implemented and number of participants (teachers and students) are the following:

a) "Down to Earth" demonstrations/workshops by UoG. In these actvities that can extend from 1 to 4 hours, demonstration sessions about asteroids, comets and impacts are offered. Moreover, the workshop features a demonstration/training of the "Impact Calculator" website from the "Down to Earth" project and includes discussions of mass extinctions and climate change, and a hands-on component where participants handle meteorites and dinosaur fossils. Six events are reported having as participants 25 teachers, 403 students and 65 science educators.

b) "Hunting for Asteroids" workshops by LJMU. These workshops demonstrate how teachers can perform observations with the Liverpool (LT) and Faulkes robotic telescopes and via a hands-on activity show how users can use the LT data and LTIMage (software) to locate and analyse near-Earth asteroids. Four such activities were performed with 19 teachers and 50 students attending.

c) "A-level/GCSE Physics Workshop" by UoG. This 2-hour workshop covers a variety of astronomy and space science topics from the UK STEM National Curriculum, with a particular emphasis on the contents of the A level Physics qualification. The activity is a mixture of talks, demonstrations and hands-on activities (both PC-based and lab-based) and covers all of the physics content at Key Stage 4 (ages 14-16). Overall, 6 teachers and 105 students participated in three such events.

Besides the aforementioned workshops, a variety of more activities took place during the second year of the project. This included

- "Galaxy Classification" workshop: A two hour workshop to demonstrate the techniques employed by astronomers to classify galaxies. The students worked with real data and used Discover the COSMOS tools and e-Infrastructures. The workshop was held for 6 teachers and was organised by LJMU. Moreover, the presentation covered both the Faulkes Telescope Project and National Schools' Observatory. The aim of this workshop was to encourage teachers to work with Faulkes Telescope and National Science Observatory, to engage school students in STEM subjects through astronomy.

- "Astronomical image processing" workshops by LJMU. These 2-hour workshops use Faulkes Telescope project resources and consist of a 40 minute talk and ~80 minute practical session. Students work on PCs to make colour images using the SalsaJ software, and learn about the applications of colour in studying astronomical images. Two such activities were implemented with 2 teachers and 31 students in total.
- Workshops on "3-color Imaging" by LJMU. The workshop includes a one hour interactive session on how to to create color images using data from robotic telescopes. Two events took place with 5 teachers and 40 students participating in them.

All UK activities are presented in detail at the end of this document (Annex).

2.4 Mini Particle Physics Masterclass in the UK for Y12 students (UB)

Four whole day mini Particle Physics masterclasses reviewing and illustrating some of the latest developments in particle physics research were held at the University of Birmingham's School of Physics and Astronomy over the last year. They are part of a national series of masterclasses, supported by the Institute of Physics. Groups of AS Level students from local schools studying physics are invited to come along with their teachers to experience for themselves the excitement of the latest research. The aim of this daily activity is to

• give students an idea of what is involved in higher level study of Physics, Particle Physics in particular, and to encourage them to perhaps consider this path at University.
• demonstrate how basic Physics principles, many of which are introduced in the A Level syllabi, can be used in the World around us – to give a relevance to the ideas.
• demonstrate some of the more interesting applications of Physics and support the school curriculum - show students that Physics leads to fascinating discoveries.

The mini particle physics masterclasses were organised by UB in December 2012, February 2013, and April 2013. About 182 students with their teachers (13) participated in the events and enjoyed talks from research staff and students; contributed to discussion sessions and Q & A sessions with academics from Birmingham and CERN itself; and took part in a "hand-on" computing activity, using the Minerva software developed as part of European outreach project - Learning with ATLAS @CERN - simulating particle detection in ATLAS.
A typical masterclass included:

- Brief Intro Talk to outline particle physics research at the LHC at CERN and principles of particle detectors
- Further talks from postgraduate researchers on specific experiments at the LHC
- Small group discussions/questions with experts
- Workshop – using MINERVA software to detect W decays and also to measure the quark content of protons.
- Live link to CERN

Students and teachers left with resources and leaflets. All schools represented were given the Discover the Cosmos USB resource stick

Figure 3. *Students enjoying activities and talks with academic staff and research students.*

Some quotes from students:

- *Link with CERN was great. The computing activity was good as well – liked that it was practical; let us see the computer facilities & understand the nature of results at CERN.*

- *I got a great understanding of how the particles move and current software developments to aid scientific research.*

- *Using the software was fun.*

2.5 Astronomy related activities in Portugal (NUCLIO, FCTUC)

The DtC activities implemented in Portugal were organized by NUCLIO and Univerity of Coibra. Mainly, there were three types of workshops realized locally that dominated, within the second

year (months 13-24) of the project, the variety of organized events. These workshops, implemented by NUCLIO and University of Coimba, are the following:

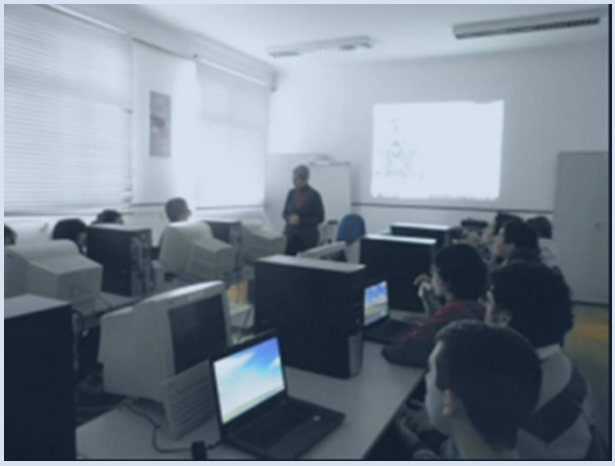
a) the *Conhecer o Universo* (To know the Universe): this is an activity that NUCLIO runs in its center in Cascais where students are engaged in interactive educational sessions. The sessions include an overview of modern astronomy with the use of advanced tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. A fruitful discussion takes place afterward aiming at introducing to the students the scientific method. Following the presentations hands-on workshops are promoted where students are given the opportunity to build sun dials, planispheres, spectroscopes, etc. and to observe the Sun with telescopes.
b) Discover the Cosmos@the Observatory: this activity takes place at the Astronomical Observatory of the University of Coimbra and includes lectures on e-infrastructures in astronomy as well as educational activities based on the tools that the Discover the COSMOS offers to the educational community.
c) the *Discover the Cosmos at Schools*: this is an activity promoted in the school where students listen to talks on Modern Topics on Astronomy, learn about Discover the Cosmos selected resources and a selection of students go to a computer lab and learn how to use the tools, observe the Sun with telescopes, learn how to make a movie with the images of the Sun from the week of the event. This strategy is very important in order to expose teachers to the tools. Our peach was that if the teachers agreed to have the students participate in the Discover the COSMOS resources session the activity would be free of charge for the school. Several teachers afterward wanted to learn more about Discover the COSMOS.

In total, the number of workshops of the aforementioned types was:

- **11** *"Discover the COSMOS at schools"* workshops with over 900 participants (73 teachers and 880 students).
- **6** *"Conhecer o Universo"* workshops with 24 teachers and 222 students
- **6** "*Discover the Cosmos@ the Observatory"* activities attended by 18 teachers and 305 students.

The full list of all demonstrations/workshops implemented in Portugal including the workshops by FCTUC are listed in the Annex.

Discover the Cosmos visited several schools in Portugal promoting science talks, workshops for students on the use of Discover the Cosmos eScience tools and eInfrastructures, workshops for teachers and science café for the local community. The activities became very popular in Portugal and the impact in the visited schools was very good. It was an effective way to inspire other teachers to become Discover the Cosmos users, to engage students on the use of cutting edge facilities for learning and to gather support from the local community to the implementation of this typology of methods for science teaching and learning.

Images above: Highlights from the Discover the COSMOS at Schools initiative

2.6 Local level Implementation activities in France, Spain, Switzerland, Austria and the US (UCM, CERN, CNSR-IAP, BMUKK, LBNL)

In addition to the implementation activities presented above, the consortium organized at local level three activities in France, five in Spain, two in Switzerland and two in Austria.

More specifically, below we present the type of implementation activity and the number of participants per country.

- ***France:*** An Academic teacher training event that was officially certified by the Ministry of Education was the only local activity reported in France (2 days training). Overall 25 teachers participated.
- ***Spain:*** In total 29 activities were implemented with about 570 participants (87 teachers, 389 students and 91 teacher trainers/educators). Seventeen out of twenty-nine of these workshops were activities held by teachers in several secondary schools in Castilla la Mancha embedding the application 'Stellar streams: measuring movements when everything moves' in the science classroom.
- ***Switzerland:*** Three events were reported a) HYPATIA one-to-one workshop with Swiss teacher trainers and physics curriculum developers from the greater Geneva area (3 participants) b) an HYPATIA mini masterclass with 8 teachers and 25 students and finally c) a CMS mini masterclass with 1 teacher and 10 students from Varvakios Pilot High School, Athens, Greece, visiting CERN.
- ***Austria:*** The ministry of Education and Culture organised nine activities in year two within the framework of WP4. Three of these events were of greater importance: The Discover the COSMOS training events that included the presentation of the project Discover the COSMOS and several demonstrators to science teachers in the region. Training activities followed the presentations engaging teachers in a) Planning of an Observation (Stellarium), b) Real Observations or remote Observations with robotic telescopes (NSO, Faulkes Telescope), c) Astronomical Data Analysis (SalsaJ). The total participants in these specific workshops were 54 teachers and 134 students and 10 stakeholders (amateur astronomers, science educators, policy makers etc.).
- ***USA:*** Two local events took place in the States over the last year. The first was a three-day teachers training workshop developed by Professor Mehri Fadavi of Jackson State

University. A total of 120 teachers participated in the workshop that introduced the Discover the COSMOS tools as part of an engaging science classroom. The second local event, namely the ASAMI– Afterschool Science and Math Integration program lasted for a period of three months and was supported by Berkeley. ASAMI merges core algebra concepts, skills and reasoning methods with Hands-On Universe curricula to engage 12 – 14 year-old students in meaningful, inquiry-based science investigations. In our 2013 pilot of ASAMI, 14 students met for 2 hours. twice a week over a period of 3 months, at Portola Middle School in El Cerrito, California, USA. Although our sample was small, the valuation using content assessments, interviews, surveys, observations and conversations revealed students' greater interest in mathematics and understanding of proportions. Furthermore, their proportional reasoning skills improved. Future work will aim to disseminate and evaluate ASAMI materials with larger and varying audiences.

3. Conclusions

In this report the local level implementations activities for the second year of the DtC project's life cycle have been documented in a structured manner by describing their learning activity, participants' profile, process and methodology applied, outcomes and follow up actions.

All partners were involved in the local implementation with activities that varied from mini masterclasses (IASA, UB), virtual visits to CERN (IASA, EA), several Astronomy days (LJMU, UoG, UCAM), workshops for students (BMUKK, NUCLIO), workshops at Observatories (UoC) followed by the collection of real data (BMUKK, UCM), and numerous training sessions and workshops (ALL) have been implemented during the second year of the project with the participation of more than 1000 teachers and 6,000 students.

More activities are planned even after the official completion of the project. The development and usage of the Discover the COSMOS Demonstrators (and the portal in general) suggests that many implementation activities will take place in schools in the near future while the community of teachers will continue to grow and produce and high quality educational material.

Country	Local level Activities (2nd year)			
	Events	Teachers	Students	Other
France	1	25	0	0
Germany	98	146	2398	0
Greece	14	146	421	0
Portugal	25	144	1427	0
Switzerland	3	15	35	3
UK	51	332	1348	11
Spain	29	87	389	91
Austria	9	78	230	41
US	2	120	0	14
Total 1st Year	489	1703	23747	394
Total 2nd Year	232	1093	6248	159
Total	721	2796	29995	553
Indicator (M24)	700			

ANNEX

Implementation Activities

Table below lists of all activities which are planned or already conducted during the project's period. The type of the event is marked according to following table:

Type	Event	Classification	Coverage
CM	Consortium Meeting	Project Coordination	International
V	Visionary Workshop	Participatory Engagement	Local/National
PR	Practice Reflection Workshop	Participatory Engagement	
S	Summative Workshop	Participatory Engagement	
T	Training and demonstration activities: workshop or seminar	Training / Implementation	Local/National
D	Dissemination event	Dissemination/Exploitation	Local/National
MC	MasterClasses	Implementation	National/International
SS	Summer School	Implementation	International
C	Conference	Dissemination/Exploitation	

1.1.1. Year 2012 / Month 1 to 4 (M13-M16)

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
September 2012							
T (L)	DtC Workshop, University of Birmingham	19 September 2012	Birmingham, UK	Introducing the DtC demonstrators and resources to teachers for use in the classroom.	DTC partners	2	UCAM
T(L)	Down to Earth	22 September 2012	Cardiff	Talk and demo, National Museum of Wales	Members of the public	65	UOG
T (L) **MC**	International Cosmic ray day	26/9/2012 (M13)	UB	Hands on group activities with teachers and school students using cosmic ray telescope demonstrator, reporting data back to quarknet project	11 high school students 3 teachers from 3 different schools in Midlands area.	11 3	UB
T(L)	1st International Cosmic Day in Germany	26/9/2012	Different locations throughout Germany and worldwide	The national network NTW as part of DtC is one of the partners of this new event,	In Germany: Students	115	TUD

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				where School groups from across the globe are meeting to ask questions like: What are cosmic particles? Where do they come from? How can they be measured? Together with their teachers and professional scientists from a university or laboratory.	Teachers worldwide: students	10 700	
T(L)	Hunting for Asteroids	2012-09-28	Penwortham Academy, Preston	Workshop to demonstrate how students can detect asteroids using DtC tools and the robotic Liverpool Telescope (a DtC e-Infrastructure) .	Students Teachers	8 4	LJMU
October 2012							
T(L)	HYPATIA workshop	1/10/2012	CERN, Switzerland	HYPATIA one-to-one workshop with Swiss teacher trainers and physics curriculum developers from the	teacher trainers	3	CERN, IASA

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				greater Geneva area			
T(L)	3-Colour Imaging	2012-10-01	Thomas Tallis School, London	A two hour workshop to explore how colour images can be created using data from robotic telescopes. Other DtC e-Infrastructures were also presented.	Students Teachers	24 5	LJMU
T(L)	Workshop and HEPHY exhibition	05.10.2012	Höhere Graphische Bundes-Lehr- und Versuchsanstalt, Vienna	Presentation of the project Discover the COSMOS and Demonstration of HEP eScience-Tool "HYPATIA" in connex to the actual discoveries at CERN (Higgs, etc.). One of the outcomes was also some short video clips about activities and trainings on national and international level involving CERN and HEPHY.	4 teachers 3 students 3 stakeholder 2 scientists	4 3 3 2	BMUKK
T(L)	Hunting for Asteroids	2012-10-08	Bohunt School, Liphook	Workshop to demonstrate how students can detect asteroids using DtC tools and the robotic Liverpool	Students Teachers	10 9	LJMU

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				Telescope (a Discover the COSMOS e-Infrastructure)			
T(L)	Astro-Night Linz	08.-09.10.2012	School Observatory "Petrineum", Linz	DtC Training Workshop: Presentation of the project Discover the COSMOS and Demonstration "How does Astronomers make observations?" 1. Planning of an Observation (Stellarium) 2. Real Observations or remote Observations with robotic telescopes (NSO, Faulkes Telescope) 3. Astronomical Data Analysis (SalsaJ)	Teachers Students Stakeholder	4 55 10	BMUKK
T(L)	Robotic Telescope Demonstration	2012-10-22	South Bromsgrove Academy	An introduction to the use of professional robotic telescopes in the educational setting, and a demonstration of different	Students Teachers	6 12	LJMU

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				DtC tools.			
T(L)	Robotic Telescope Demonstration	2012-10-23	Priory Community Academy, Weston-SM	An introduction to the use of professional robotic telescopes in the educational setting, and a demonstration of different DtC tools.	Students Teachers	12 6	LJMU
T(L)	Training and Tracking workshop using the e-application: "Setting references when everything moves"	October 24th, 2012	Alonso Quijano Secondary School (Quintanar de la Orden, Toledo)	After a meeting held in July 2012, a group of High Schools enroled a Research project led by UCM, who also developed the e-application to facilite the students and teachers participation. Several groups were set and their activity was tracked "in situ" with the colaboration of a local Science Center. This entry corresponds to one of those Workshops.	Teachers Other	10 2	UCM
T(L)	Training and Tracking workshop using the e-application: "Setting references when everything	October 26th, 2012	Mora (Toledo)	After a meeting held in July 2012, a group of High Schools enroled a Research project led by UCM, who	Teachers	2	UCM

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
	moves"			also developed the e-application to facilite the students and teachers participation. Several groups were set and their activity was tracked "in situ" with the colaboration of a local Science Center. This entry corresponds to one of those Workshops.	Other	2	
November 2012							
T(L)	Robotic Telescope Demonstration	2012-11-06	Manchester Communication Academy	An introduction to the use of professional robotic telescopes in the educational setting, and a demonstration of different DtC tools.	Students Teachers	0 6	LJMU
T(L)	Galaxy Classification Workshop	2012-11-07	Horbury Academy, Horbury	A two hour workshop to demonstrate the techniques employed by astronomers to classify galaxies. The students	Students Teachers	12 4	LJMU

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				worked with real data and DtC tools and e-Infrastructures.			
T(L)	Down to Earth	7th November	Wales	Talk and demo, Pontypool	Students Teachers	28 2	UOG
T(L)	Discover the Cosmos at schools	07/11/2012 and 12/11/2012 Esc. Sec. Matias Aires	Sintra	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image	7th to 10th grade students Teachers	100 6	NUCLIO

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T(L)	Conhecer o Universo (To know the universe)	08/11/2012 Escola Básica Rómulo de Carvalho	Cascais, Portugal	Talks followed by a Sun observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Students Teachers	26 3	NUCLIO
T(L) **MC**	HYPATIA mini masterclass	15/11/2012	Athens College, Athens, Greece	Mini masterclass combined with virtual visit to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2012/Athens-2012.html	Greek high school students teachers	25 8	IASA, CERN
T(L)	Hunting for Asteroids	2012-11-19	Battle Abbey School, Battle	Workshop to demonstrate how students can detect asteroids using DtC tools and the robotic Liverpool Telescope (a DtC e-	Students Teachers	17 6	LJMU

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				Infrastructure)			
T(L)	Down to Earth	20th November	Monmouth, Wales	Talk and demo, Monmouth	Students Tecahers	90 8	UOG
T - Local	Training and Tracking workshop using the e-application: "Setting references when everything moves"	November 22nd, 2012	IES Aldonza Lorenzo secondary school, La Puebla de Almoradiel	After a meeting held in July 2012, a group of High Schools enroled a Research project led by UCM, who also developed the e-application to facilite the students and teachers participation. Several groups were set and their activity was tracked "in situ" with the colaboration of a local Science Center. This entry corresponds to one of those Workshops.	Training and Tracking workshop using the e-application: "Setting references when everything moves"	2 2	UCM
T[L]	Astro-Night Salzburg	23.11.2012	HAK and observatory Bergheim, Salzburg	DtC Training Workshop: Presentation of the project Discover the COSMOS and Demonstration of several topics: 1. Planning of an	30	7 teachers 12 students 3 stakeholder 8 scientists	BMUKK

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				Observation (Stellarium) 2. Real Observations or remote Observations with robotic telescopes (NSO, Faulkes Telescope) 3. Astronomical Data Analysis (SalsaJ) 4. Mobile Applications for astronomy			
T - Local	Discover the Cosmos at schools	27/11/2012 Escola Sec. Alfredo da Silva	Barreiro	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a	7th to 10th grade students Teacher	50 6	NUCLIO

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T - Local	Teacher Training workshop	29/11/2012 (M15)	Birmingham Met College, Midlands STEM organised day to which we are contributing a workshop	Hands-on workshop to demonstrate cosmic telescope activity to a group of teachers from FE colleges in Midlands area	FE College teachers (A Level physics & BTec Sciences) from different Midlands Colleges coordinator of FE Teacher training	7 1	UB

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
T(L)	Down to Earth	29th November	Bridgend, Wales	Talk and demo,	Students teachers	150 7	UOG
T(L)	Robotic Telescopes for Primary Schools	2012-11-30	Liverpool John Moores University	Presentation on how primary school age children can benefit from robotic telescope technology.	Students Teachers	0 40	LJMU
December 2012							
T(L)	Robotic Telescope for Secondary Schools	2012-12-03	Priory Sports and Technology College	Presentation on how secondary school age children can benefit from having access to robotic telescopes.	Students Teachers	0 12	LJMU
T(L)	Robotic Telescope for Secondary Schools	2012-12-04	Priory Sports and Technology College	Presentation on how secondary school age children can benefit from having access to robotic telescopes.	Students Teachers	0 6	LJMU

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
T(L) **MC**	Particle Physics masterclass	5/12/2012		Talk, demonstration of spark chamber, cloud chamber and cosmic ray telescopes, and workshop using Minerva software	Y12 students teachers from 4 different Midlands schools	18 3	UB
T(L)	A-level Physics workshop	7th December 2012	Wales	Talk and demo,	Students Teachers	15 2	UOG
T(L) **MC**	School outreach visit with Particle Physics focus	11/12/2012	UB	Talk including spark chamber demo and using Minerva software	Y12 students teachers from 2 different Midlands schools	34 3	UB
T(L) **MC**	HYPATIA mini masterclass	12/12/2012	2nd Moschato High School, Athens, Greece	Mini masterclass combined with virtual visit to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2012/Athens_Moschat	Greek high school students teachers	30 6	IASA, EA, CERN

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				o-2012.html			
T(L)	NAWI Netzwerktreffen (Science Network)	12.12.2012	Windischgarsten, Upper Austria	DtC Training Workshop: Presentation of the project Discover the COSMOS and several demonstrators to science teachers in the region. Following e-Science Tools and e-Infrastructures were trained: 1. Planning of an Observation (Stellarium) 2. Real Observations or remote Observations with robotic telescopes (NSO, Faulkes Telescope) 3. Astronomical Data Analysis (SalsaJ)	50	50 science teachers	BMUKK
T(L)	Astronomy Workshop	2012-12-13	Langton Star Centre	General session about astronomy and using telescopes to explore and learn about the Universe	Students Teachers	24 3	LJMU
T(L)	Become a CERN scientist for an hour	6/12/2012	Protipo Athinon High	Mini masterclass for teachers and students	Greek	30	IASA, EA, CERN

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
MC			School, Athens, Greece	combined with virtual visit to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2012/Athens_Protipo-2012.html	teachers high school students	 5	
T(L) **MC**	The experiment of the century in the school classroom	15/12/2013	EKFE Argos, Greece	Students from all high schools of Argos, Greece, took part in this interactive workshop that combined a HYPATIA mini masterclass with a virtual visit to the ATLAS experiment at CERN. More details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Argos-2013.html	Greek high school students teachers	30 10	IASA, CERN
T(L)	Astro-Night Wien	18.12.2012	Institut für Astrophysik, Vienna	DtC Training Workshop: Presentation of the project Discover the COSMOS and several demonstrators to science teachers in the	80	80 students	BMUKK

Type	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				region. Following e-Science Tools and e-Infrastructures were trained: 1. Planning of an Observation (Stellarium) 2. Real Observations or remote Observations with robotic telescopes (NSO, Faulkes Telescope) 3. Astronomical Data Analysis (SalsaJ)			

Table 1. Dissemination and Exploitation Activities 2012

1.1.2. Year 2013 / Month 17 to 24

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
January 2013							
T -	Discover the Cosmos@ the	02 January 2013	Astronomical Observatory of the	Activities of the project with students of the "clube	students	20	UoC

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
Local	Observatory		University of Coimbra	de tempos livres de Santa Clara"	teachers	2	
T(L)	Discover the Cosmos Workshop	2013-01-05	ASE Conference Reading	Two hour workshop to discuss and demonstrate the various tools and e-Infrastructures available through the DtC portal.	Students Teachers	0 22	LJMU
T(L)	"Discover the Cosmos" Particle Physics teachers round table	09.01.2013	TU Dresden	A regularly meeting group of teachers engaged in modern physics, esp. in particle physics and astronomy.	teachers	15	TUD
T(L)	Conhecer o Universo (To know the universe)	10/01/2013 Esc. Básica de Tires	Cascais, Portugal	Talks followed by a Sun observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Students Teachers	43 7	NUCLIO
T(L)	Discover the Cosmos at schools	15/01/2013 Colégio da Bafureira	Parede	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images	7th grade students Teacher	30 2	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T(L)	Astronomy Workshop (Year 8)	2013-01-21	The Long Eaton School	General workshop to introduce students to working with telescope data and DtC tools	Students Teachers	32 2	LJMU
T(L)	Astronomy Workshop (Year 11)	2013-01-21	The Long Eaton School	General workshop to introduce students to	Students Teachers	20	LJMU

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				working with telescope data and DtC tools		1	
T(L)	Down to Earth workshop	25.01.2013	Magor, South Wales	A 1-hour lecture and demonstration session about asteroids, comets and impacts.	Students Teachers	50 5	UOG
T(L)	Training and Tracking workshop using the e-application: "Setting references when everything moves"	January 30, 2013	IES Aldonza Lorenzo secondary school, La Puebla de Almoradiel	After a meeting held in July 2012, a group of High Schools enroled a Research project led by UCM, who also developed the e-application to facilite the students and teachers participation. Several groups were set and their activity was tracked "in situ" with the colaboration of a local Science Center. This entry corresponds to one of those Workshops.	Teachers Students Other	2 27 3	UCM

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
February 2013							
T - Local	Discover the Cosmos at schools	04/02/2013 Esc.Dr. Júlio Martins	Chaves	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other	7th to 10th grade students Teacher	100 10	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				students and promoting further workshops in the school.			
T - Local	Training and Tracking workshop using the e-application: "Setting references when everything moves"	Feb 6th, 2013	IES Aldonza Lorenzo secondary school, La Puebla de Almoradiel	After a meeting held in July 2012, a group of High Schools enrolled to a Research project led by UCM, who also developed the e-application to facilite the students and teachers participation. Several groups were set and their activity was tracked "in situ" with the collaboration of a local Science Center. This entry corresponds to one of those Workshops.	Teachers Students Other	2 25 3	UCM
T	Workshop for students – ASAMI	Feb – April 2013	GHOU / UC Berkeley	ASAMI – Afterschool Science and Math Integration. merges core algebra concepts, skills and reasoning methods with Hands-On Universe curricula to engage 12 – 14 year-old students in	Students	14	UC Berkeley

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				meaningful, inquiry-based science investigations. In our 2012 pilot of ASAMI, 14 students met for 2 hours. twice a week over a period of 3 months, at Portola Middle School in El Cerrito, California, USA. Although our sample was small, the valuation using content assessments, interviews, surveys, observations and conversations revealed students' greater interest in mathematics and understanding of proportions. Furthermore, their proportional reasoning skills improved. Future work will aim to disseminate and evaluate ASAMI materials with larger and varying audiences.			
T (L)	Conhecer o Universo (To know the	07/02/2013	Cascais, Portugal	Talks followed by a Sun	Students	44	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
	universe)	EB1 Nº. 2 de Alcabideche		observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Teachers	4	
T(L)	Robotic Telescope for Primary Schools	2013-02-08	Hermitage Academy	Demonstration (one hour) of how primary schools can make use of robotc telescopes.	Students Teachers	75 0	LJMU
T(L) MC	Introduction to Particle Physics masterclass	13/2/2013 (M18)	UB	PP talk and workshop using Minerva software to calculate particle mass	UG Astronomy major students from UoG (Y3)	~ 10	UB
T - Local	Training and Tracking workshop using the e-application: "Setting references when everything moves"	Feb. 15th, 2013	Observatorio La Hita	A hands-on training session with telescopes in the Observatorio de la Hita (the local science center) for some of the teachers and students participating the Research project "Setting references when everything moves".	Teachers Students Other	10 35 30	UCM
T(L)	Astronomy Workshop	2013-02-18	Hautlieu School	General introduction to working with data from a robotic telescope using DtC tools.	Students Teachers	15 2	LJMU

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
T(L)	Astronomy Workshop	2013-02-18	Hautlieu School	General introduction to working with data from a robotic telescope using DtC tools.	Students Teachers	15 2	LJMU
T(L)	Conhecer o Universo (To know the universe)	21/02/2013 EB1 Nº. 2 de Alcabideche	Cascais, Portugal	Talks followed by a Sun observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Students Teachers	44 4	NUCLIO
T(L) **MC**	HYPATIA mini masterclass	26/02/2013	Yannopoulos High School, Glyfada, Greece	Mini masterclass for teachers and students combined with virtual visit to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Glyfada-2013.html	Greek high school students teachers	30 3	IASA, EA, CERN
March 2013							
T – L **MC**	HYPATIA mini masterclass	1/03/2013	1st Senior High School, Pyrgos, Greece	Mini masterclass for teachers and students combined with virtual visit	Greek teachers	20	IASA, CERN

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
local				to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Pyrgos-2013.html	students	20	
T(L)	Astronomy Workshop (Trainee Teachers)	2013-03-04	Liverpool	Demonstration to trainee teachers about how modern e-Infrastructures can be embedded into classroom teaching, and how they can be uase to enthuse students about science and technology.	Students Teachers	0 25	LJMU
T(L)	Astronomy Workshop (Trainee Teachers)	2013-03-04	College of Life-long Learning, Bangor	Demonstration to trainee teachers about how modern e-Infrastructures can be embedded into classroom teaching, and how they can be used to enthuse students about science and technology	Students Teachers	0 34	LJMU
T(L)	Discover the Cosmos at schools	04/03/2013 Esc. Sec. Abel	São Mamede Infesta	Interactive sessions with schools students. The	7th to 10th grade students	100	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
		Salazar		sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.	Teacher	10	
T – L	HYPATIA mini masterclass	12/03/2013	3rd High school,	Mini masterclass for	Greek high	30	IASA, EA,

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
MC local			Komotini, Greece	students combined with virtual visit to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Komotini-2013.html	school students		CERN
T(L)	Discover the Cosmos at schools	12/03/2013 Esc.Alto dos Moinhos	Terrugem	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image	7th to 10th grade students Teacher	60 4	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T(L)	Discover the Cosmos@ the Observatory	12 March 2013	Astronomical Observatory of the University of Coimbra	Activities of the project with students of the school Gafanha da Nazaré * Photos: https://www.facebook.com/media/set/?set=a.313343335460008.1073741826.135303989930611&type=3	students teachers	80 2	UoC
T - Local	Discover the Cosmos at schools	13/03/2013 Esc.Sec. Mães Dágua	Amadora	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's	7th to 10th grade students Teacher	120 7	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T(L)	Discover the Cosmos at schools	14/03/2013 Esc.Sobral de Monte Agraço	Sobral de Monte Agraço	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images	7th to 10th grade students Teacher	200 10	NUCLIO

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T(L)	Astronomy Workshop (Primary)	2013-03-14	Keswick School	One hour workshop to demonstrate how students in primary school can use robotic telescopes to do real science,.	Students Teachers	30 5	LJMU
T(L)	Astronomy Workshop (Primary)	2013-03-14	Keswick School	One hour workshop to	Students	32	LJMU

	Event	Date (Project Month)	Location	Purpose	Participants	Nº part. per category	Partner
				demonstrate how students in primary school can use robotic telescopes to do real science,.	Teachers	6	
T(L)	Astronomy Workshop (Year 11)	2013-03-14	Keswick School	One hour workshop to demonstrate how sixth-form students can use robotic telescopes to do real science,.	Students Teachers	12 1	LJMU
T(L)	Astronomy Workshop (Year 10)	2013-03-15	Keswick School	Presentation on how astronomers use modern telescope technology to explore the Universe and extend our knowledge.	Students Teachers	16 1	LJMU
T(L)	Down to Earth talk	21.03.2013	Radnor, South Wales	Presentation on how astronomers use modern telescope technology to explore the Universe and extend our knowledge..	Students Tecahers	180 9	UOG
T - Local	Discover the Cosmos@ the Observatory	21 March 2013	Astronomical Observatory of the	Activities of the project with students of the "Clube	students teachers	50	UoC

			University of Coimbra	de tempos livres de Alvaiázere"		4	
T - L	Academic teacher training	21-22/March 2013	Braciex , France	Academic teacher training officially certified by the Ministry of Education (2 days training)	Teachers	25	IAP / CNRS

T(L)	Discover the Cosmos@ the Observatory	28 March 2013	Astronomical Observatory of the University of Coimbra	Activities of the project with students of the school Externato da Benedita – Caldas da Rainha * Photos: https://www.facebook.com/media/set/?set=a.351487604978914.1073741838.135303989930611&type=3	students teachers	100 8	UoC
T(L) **MC local**	HYPATIA mini masterclass	28/03/2013	Doukas High School, Athens, Greece	Mini masterclass for students with students from 3 high schools of Athens, combined with virtual visit to the ATLAS experiment. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-	Greek high school students	50	IASA, EA, CERN

				virtual-visit/2013/Athens-2013.html			
T(L)	ATLAS Virtual Visit	28/03/2013	5th High School, Volos, Greece	Virtual visit to the ATLAS experiment combined with lecture about CERN. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Volos-2013.html	Greek senior high school students	60	CERN, EA
T(L)	ATLAS Virtual Visit	29/03/2013	3rd Junior High School, Volos, Greece	Virtual visit to the ATLAS experiment combined with lecture about CERN. Details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Volos1-2013.html	Greek junior high school	100 students	CERN, EA

April 2013							
T(L)	Discover the Cosmos at schools	03/04/2013 Esc.Sec da Terrugem	Terrugem	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of	7th to 10th grade students Teacher	60 8	NUCLIO

				modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			

T(L)	NSO Teacher Training	2013-04-08	Robert Smyth Academy	Half-day session on how teachers can use DtC e-Infrastructures to enthuse students about science and	Students Teachers	0 28	LJMU

				technology.			
T - Local	Conhecer o Universo (To know the universe)	11/04/2013 EB1 Alto da Peça	Cascais, Portugal	Talks followed by a Sun observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Students Teachers	22 2	NUCLIO
T(L)	A-level Physics Workshop	16.04.2013	Rhymney, Wales	A 2-hour workshop covering a variety of astronomy and space science topics from the UK STEM National Curriculum, with a particular emphasis on the contents of the A level Physics qualification.	Students Teachers	20 1	UOG
T(L) MC	Particle Physics Masterclass	17/4/2013	UB	Talks & workshops incl use of Minerva software tool	students aged 17/18 from a number of different schools	~120	UB
T(L)	Conhecer o Universo (To know the universe)	18/04/2013 EB1 Alto da Peça	Cascais, Portugal	Talks followed by a Sun observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Students Teachers	25 2	NUCLIO

T(L) MC local	HYPATIA mini masterclass	17/04/2013	General High School and Vocational High School, Karlovasi, Samos, Greece 2nd Junior High School, Lakki, Leros, Greece	Mini masterclass and virtual visit to the ATLAS experiment by students of General High School and Vocational High School, Karlovasi, Samos, Greece. Virtual visit to the ATLAS experiment combined with lecture about CERN. For both events, details: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/SamosLeros-2013.html	Greek high school students teachers	20 3	IASA, CERN
T(L) MC local	HYPATIA mini masterclass	18/04/2013	Pythagorio General High School and Mavrogenio Vocational High School, Vathi, Samos, Greece	Mini masterclass and virtual visit to the ATLAS experiment by students of Pythagorio General High	Greek high school students teachers	20	IASA, CERN

				School and Mavrogenio Vocational High School, Vathi, Samos, Greece. Details here: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Samos-2013.html		5	
T(L)	Hands-on workshop with teachers and students colaborating the Research project.	April 19th, 2013	La Hita Observatory, Toledo	A final hands-on activity with telescopes in the Observatorio de la Hita (the local science center) for some of the teachers and students participating the Research project "Setting references when everything moves".	Teachers Students Other	10 25 15	UCM
T - Local	Hands-on workshop with teachers and students collaborating the Research project.	April 19th, 2013	La Hita Observatory, Toledo	A final hands-on activity with telescopes in the Observatorio de la Hita (the local science center) for some of the teachers and students participating the Research project "Setting references when	Teachers Students Other	10 25 15	UCM

				everything moves".			
T(L) **MC local**	HYPATIA mini masterclass	24/04/2013	1st and 3rd High Schools, Chios, Greece	Mini masterclass and virtual visit to the ATLAS experiment by students of 1st and 3rd High Schools, Chios, Greece. Details here: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Chios-2013.html	Greek high school students	50	IASA, CERN, EA
T(L)	School projects with CERN - HEPHY	29.04.2013	Vienna	DtC Training Workshop: Workshop about the cooperation and concrete school projects involving CERN and HEPHY. The outcome was the planning of the master classes on 5th and 6th of June in two different schools in Graz.	6	3 teachers 3 scientists	BMUKK

May 2013							
T(L)	A-level/GCSE Physics Workshop	03.05.2013	Bristol, UK	A 2-hour workshop covering a variety of astronomy and space science topics from the UK STEM National Curriculum, with a particular emphasis on the contents of the A level Physics qualification.	Students Tecahers	70 4	UOG
T (L) MC local	CMS mini masterclass	8/05/2013	CERN, Switzerland	CMS mini masterclass with students from Varvakios Pilot High School, Athens, Greece, visiting CERN. Details here: http://discoverthecosmos.eu/news/194	Greek high school students teacher	10 1	CERN
T(L)	Discover the COSMOS live	08.05.2013	Bildung Online 2013, Kurhaus, Hall in Tyrol	DtC Training Workshop: Presentation of the project Discover the COSMOS and several demonstrators to	38	5 teachers 2 teacher trainees 25 students	BMUKK

				science teachers in the region. Following e-Science Tools and e-Infrastructures were trained: 1. Planning of an Observation (Stellarium) 2. Real Observations or remote Observations with robotic telescopes (NSO, Faulkes Telescope) 3. Astronomical Data Analysis (SalsaJ)		4 stakeholder 2 scientists	
T(L)	Training Workshop	10 May 2013	Observatorio La Hita	Hands-on activity on astronomy and presentation of some simple e-resources/tools (Stellarium) from the Discover the Cosmos project	Students Teachers Others	13 1 3	UCM
T(L)	Discover the Cosmos@ the Observatory	9 May 2013	Escola Secundária de Loulé	Activities of the project with students of the school Escola Secundária de Loulé: * Photos: https://www.facebook.com/photo.php?fbid=41598917	students teachers	15 1	UoC

				5175927&set=a.415989131842598.1073741825.100002945453306&type=1&theater			
T(L)	Conhecer o Universo (To know the universe)	09/05/2013 EB1 Tires	Cascais, Portugal	Talks followed by a Sun observing session and a demonstration of Salsa J/ Sun4all and Stellarium	Students Teachers	40 4	NUCLIO
T(L)	Discover the Cosmos@ the Observatory	10 May 2013	Escola Secundária de Olhão	Activities of the project with students of the school Escola Secundária de Olhão: https://www.facebook.com/sol.paratodos.OAUC/media_set?set=a.415991681842343.1073741826.100002945453306&type=3	students teachers	20 1	UoC

T (L)	Mini Masterclass	14.0.2013	Ioannina, Greece	Teacher and Student Education	High school teachers Students	40 3	IASA / EA

T(L)	Discover the Cosmos at schools	21/05/2013 Esc.Sec Prof. Armando Lucena	Malveira	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.	7th to 10th grade students Teacher	30 7	NUCLIO

				In this particular activity we had the students promoting a science talk to the local community … a BIG HIT			

T - Local	Discover the Cosmos@ the Observatory	28 May 2013	Astronomical Observatory of the University of Coimbra	Activities of the project with students of the school Colégio da Imaculada Conceição (Cernache – Coimbra) * Photos: https://www.facebook.com/media/set/?set=a.336815653112776.1073741830.135303899306 11&type=3	students teachers	40 2	UoC

June 2013	

T(L)	Amazing Space Workshop	2013-06-03	St Leonard's School, St Andrews	General introduction to astronomy, and to how scientists use technology to explore the Universe.	Students Teachers	30 4	LJMU
T(L)	HEPHY/CERN Master class	05.06.2013	BORG Monsbergergasse, Graz	Master class for students/teachers organized by HEPHY using the tool HYPATIA.	35	3 teachers 30 students 2 scientists	BMUKK
T(L)	HEPHY/CERN Master class	06.06.2013	GIBS, Graz	Master class for students/teachers organized by HEPHY using the tool HYPATIA.	29	2 teachers 25 students 2 scientists	BMUKK
T(L)	Mississippi workshops	June 6th to 8th	Jackson State University, Jackson, Mississippi	developed by Professor Mehri Fadavi of Jackson State University	Teachers	120	GHOU – UC Berkeley

T(L)	Discover the Cosmos at schools	12/06/2013 Colégio Miramar	Mafra	Interactive sessions with schools students. The sessions include an overview of modern astronomy with the use of modern tools such as Stellarium, Salsa J and research quality images	7th grade students Teacher	30 3	NUCLIO

				from Coimbra's Observatory and Faulkes Telescope Archives. We promote an interactive discussion introducing them to the scientific method. After the presentation we promote a workshops on the use of digital resources such as: Planetaria Software, Image processing software. The students that participate in the workshop are in charge of sharing the learning experience with other students and promoting further workshops in the school.			
T(L)	Astronomy Workshop (Primary)	2013-06-26	Granaries Business Park, Prestatyn	Demonstration of how primary age children can use robotic telescopes to do "real" science.	Students Teachers	0 14	LJMU
T(L)	The LHC, King Nestor and the Mysteries of the Universe	26/06/2013	Hellenic Physical Society's Student Summer School, Eretria,	Virtual visit to the ATLAS experiment combined with lecture about LHC, CERN	Greek high school students	30	CERN, EA

			Greece	and the mysteries of the Universe. Details here: http://atlas-live-virtual-visit.web.cern.ch/atlas-live-virtual-visit/2013/Eretria-2013.html			
T(L)	Down to Earth workshop	28.06.2013	West Wales, UK	A 2-hour workshop using the "Down to Earth" project resources (part of the Discover the Cosmos resource library, developed by the Faulkes Telescope Project at Univ. of Glamorgan), consisting of a 60 minutes of talk and ~60 minutes of practical sessions. Students worked on PCs to study the physics of impact cratering, and used the online Google Earth/Moon/Mars websites to examine craters on these bodies. Examples of meteorites and dinosaur fossils were examined by	Students Teachers	85 3	UOG

				participants.			

July 2013							
T(L) MC - Local	Physics Experience day	2/7/2013 (M23)	Birmingham	Researchers and PG students demonstrating PP experiments with emphasis on data taking and analysis	school children gaining experience radioactive decays, in a cloud chamber, and cosmic rays with a scintillator telescope, collecting and analysing data etc. + 0 teachers	25	UB

T(L)	Hunting for Asteroids	2013-07-08	ARI Work Experience Week, Liverpool	One hour interactive workshop to demonstrate how robotic telescopes can be used to detect and track near-Earth asteroids.	Students Teachers	15 0	LJMU

T(L)	Astronomical Image Processing	2013-07-08	ARI Work Experience Week, Liverpool	One hour interactive workshop to demonstrate the use of DtC tools and e-Infrastructures,	Students Teachers	16 0	LJMU
T(L)	3-Colour Imaging	2013-07-09	ARI Work Experience Week, Liverpool	One hour interactive workshop to create colour images using data from robotic telescope.	Students Teachers	16 0	LJMU
T(L)	Galaxy Classification Workshop	2013-07-09	ARI Work Experience Week, Liverpool	One hour interactive workshop to demonstrate how astronomers classify galaxies.	Students Teachers	15 0	LJMU
T(L)	Astronomical Image Processing	2013-07-09	Whitchurch High School	One hour interactive workshop to demonstrate the use of DtC tools and e-Infrastructures,	Students Teachers	15 2	LJMU

T(L)	Trial of DtC resources used for EPQ advanced qualifications in UK	15/7/2013 – 31/8/2013	UB	Selected enthusiastic students from local schools will investigate DtC resources and devise projects to work on over the Summer to act as Case Studies on the A Level web	Y12 students from different Local schools	~ 3/4	UB

				sites for EPQ ideas for future students.			
T(L)	Bonner Schülerakademie	22.-26.07.2013	Bonn	Students experience different fields of physics and astronomy, accomplish experiments and analyze real data from the ATLAS detector at CERN	Students	20	TUD
August 2013							
T(L)	Preparation workshop to keep the activity during the academic year 2013-2014	August 8th, 2013	Observatorio La Hita	Hands on workshop and preparatory activity to keep the interaction with teachers for the next academic year.	Teachers Students Other	5 9 9	UCM
T(L)	Preparation workshop to keep the activity during the academic year 2013-2014	August 10th, 2013	Observatorio La Hita	Hands on workshop and preparatory activity to keep the interaction with teachers for the next academic year.	Teachers Students Other	15 0 22	UCM

Non Fixed Dates (2012 – 2013)							
T(L) MC	Series: NTW National Masterclasses in Particle Physics	01/09/12 – 31/08/2013	Throughout Germany The single dates and places you will find here: http://www.teilchenwelt.de/aktuelles/termine/	75 one-day-workshops at schools, in school labs and other institutions of education: Guided by young scientists, young people provide data measurements from LHC in real-life conditions like physicists do and explore the fascination of modern science. Throughout the country, young particle physicists, being mobile experts, are on the road to host "masterclasses" in schools, museums and other institutions of education.	High school teachers High school students	75 1875	TUD
T(L) MC	10 Astro-particle Project Weeks	01/09/12 – 31/08/2013	Aachen, Dresden, Wuppertal, Zeuthen	Teachers lend astro-particle experiments from a nearby particle physics research institute. In an introductory day, young	Students Teachers	200 10	TUD

				scientists present and explain these experiments to the participating students. The students then work with the experiments and evaluate their measurements with their physics teachers.			
T(L) MC	35 Astro-particle Research Weeks	01/09/12 – 31/08/2013	DESY Zeuthen	DESY in Zeuthen offers research weeks for high school students throughout the year. Students get the opportunity to learn about cosmic-rays and conduct their own experiments on this topic.	students	20	TUD
T(L)	Workshop for studnets – ASAMI	Feb – April 2013	GHOU / UC berkeley		Students	14	UC Berkeley
T(L) MC	6 NTW National Masterclasses in astro-Particle Physics	01.09.12-31.08.13	various places in Germany	Tracking the Big Bang: With 'Netzwerk Teilchenwelt' (Network ParticleWorld) one can experience particle physics and astro-particle physics within one's reach. During workshops in schools, school labs and museums	high school students teachers	150 6	TUD

				all over Germany, young people and their teachers enter the world of quarks, electrons and company.			
T(L) MC	Astro-particle Research Weeks at the University of Erlangen	03/09 – 07/09/2012 and 02/04 – 06/04/2013	Erlagen	Twice a year, the German Network „Netzwerk Teilchenwelt" in cooperation with the Helmholtz-Association for astro-particle physics offer research weeks for high school students aged 16 and over. Students get the opportunity to learn about cosmic-rays and conduct their own experiments on this topic.	high school students	18	TUD
T(L)	Be Stars with Faulkes Telescope		Valencia	Faulkes Telescopes Project carried on by 5 teachers in a long term project covering the whole academic year.	Teachers Students	5 0	UCM
T(L)	[2] a group of highly qualified students in Madrid, working with the HOU-wiki scenarios during the semester (about 5 meetings 1 teacher		Madrid	Activities using the WIKI based platform of Hands-On Universe (Spain). Every Saturday morning at a	Teachers	1	UCM

	and 12 students)			school for high qualified capacities' students in the region of Madrid. www.houspain.com (5 sessions)	Students	12	
T(L)	"Setting references when everything moves" (about 10 teachers each with 20-30 students)		Castilha la Mancha Region	Several activities held by teachers in several secondary schools in Castilla la Mancha engaging the application 'Stellar streams: measuring movements when everything moves' (17 sessions)	Teachers Students	10 ~250	UCM

Table 2. Implementation Activities September 2012-August 2013