Go-Lab

Global Online Science Labs for Inquiry Learning at School

Collaborative Project in European Union's Seventh Framework Programme

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Deliverable D9.3

Report of Dissemination and Exploitation Activities (Year 2)

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Contributors

Name	Institution
Diana Dikke	IMC
Samira Rzakulieva	IMC
Nils Faltin	IMC
Yiwei Cao	IMC
Henny Leemkuil	UT
Georgios Mavromanolakis	EA
Denis Gillet	EPFL
Sten Govaerts	EPFL
Evita Tasiopoulou	EUN
Vasilis Fasoulis	MENON
Effie Law	ULEIC
Constantinos Manoli	UCY
Zacharias Zacharia	UCY
Sven Manske	UDE
Adam Giemza	UDE
Miguel Rodriguez Artacho	UNED
Panagiotis Zervas	CERTH
Olga Dziabenko	UDEUSTO
Amir Mujkanovic	CUAS
Margus Pedaste	UTE
Urmas Heinaste	UTE
Angelos Alexopoulos	CERN
Fraser Lewis	USW
Christine Kourkoumelis	IASA
Rosa Doran	NUCLIO
Joanna Holt	ESA
Ton de Jong (peer-review)	UT
Eleftheria Tsourlidaki (peer-review)	EA

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Executive Summary

In the Go-Lab project, WP9 “Dissemination and Exploitation” aims at promoting the project and its results among different groups of stakeholders in order to support the dissemination and implementation of these results and assure their sustainability after the project time. To do this, WP9 conducts various online and offline dissemination activities, establishes and supports contact to potential end-users as well as other important stakeholders like Ministries of Education and online lab providers, cooperates with other projects, communities and standardization bodies for inquiry learning technology, and creates information and supportive materials (including an online course) for teachers allowing them to understand and use the project outcomes in their everyday teaching practice.

In the Year 2, WP9 updated the contents of the project website representing the newest project developments and actively used online channels to disseminate them. Go-Lab online community demonstrated significant growth compared to the Year 1: the website was visited by 20,358 users (compare to 1,460 in Year 1), 138 users subscribed to the project newsletter (34 in Year 1), and the total number of newly joined Go-Lab online community members lies by 753 users (121 in Year 1)[1]. The number of offline dissemination activities is similar to the Year 1 (which can be explained by availability of organizers and participants): 54 presentations of the project reaching 3,422 participants were given, 40 workshops and events involving 1,356 participants were organized by the project, plus 18 joint events reaching 953 participants were organized in cooperation with other communities and consortia, and finally project’s booths at conferences and exhibitions addressed about 15,000 people. In addition, the project created a Smart Show explaining the project in a simple way (and provided with subtitles in seven languages) and several demo-videos. The work on the Go-Lab MOOC for teachers has started.

Implementation of the Go-Lab project is supported by Ministries of Education (MoEs) in Greece, Portugal, Spain, and Belgium. Actions to involve Dutch and Swiss MoEs are being taken (see Section 2.4.3). Furthermore, to strengthen the standardization and adaptation of the project results, Go-Lab members are involved in the IEEE Working Group P18761 on Networked Smart Learning Objects for Online Laboratories working on standardization of the technology on different levels (see Section 3.5.1). Finally, preparation of the actions supporting sustainability and exploitation of the project results has started by creating a strategy for the whole consortium and its particular members, described in Section 3 of this Deliverable.

[1] All numbers excluding project members

Table of Contents

1 Introduction

WP9 concentrates on dissemination of the project among identified groups of individual and organizational stakeholders and on preparing exploitation of the project's results after the project time. This is done by using various online and offline dissemination channels and activities (tasks T9.1, T9.2), establishing contact to and conducting joint activities with related projects and associations (task T9.3), preparing standardization of the technology (task T9.4), as well as mainstreaming Go-Lab results, transforming them in suitable products for different target groups and creating recommendations for implementation (tasks T9.5 and T9.6).

The work of WP9 in the first project year addressed mostly the tasks T9.1, T9.2, and T9.3 creating online infrastructure and print dissemination materials, as well as conducting promotional activities. Also, the dissemination strategy was defined in order to address identified target groups and synchronize WP9 activities with those of other work packages and assure appropriate planning and targeted use of dissemination channels (see Deliverable D9.2 "Report on Dissemination and Exploitation Activities – Year 1" (M12)).

In the second year, WP9 concentrated on implementation of planned activities, created additional dissemination materials like project and demo videos, started creation of the Go-Lab MOOC for teachers, and took first actions to prepare standardization of the project results. Furthermore, project's strategy for sustainability and exploitation was defined, including planning for the whole consortium and the bundle of project results, as well as individual planning of each consortium member. This strategy will be revised and updated in the upcoming periods according to the implementation progress as well as validation results in order to assure its applicability during and after the project time.

This Deliverable is divided into two main parts. The first part (Section 2) provides a report on dissemination activities. It describes how the initial plan was implemented (Section 2.1) and represents online and offline activities as well as corresponding statistics (Section 2.2 and Section 2.4). Section 2.5 evaluates Key Performance Indicators and defines directions for future actions. Go-Lab MOOC (concept and progress) is described in Section 2.3. The second part of the Deliverable (Section 3) represents the sustainability and exploitation plan including description of planned exploitable results, planned technology transfer and standardization measures, sustainability and exploitation concept for project results and additional services, as well as individual use and transfer plans of consortium partners. In Summary an overview of past and planned actions is provided.

2 Dissemination Plan and Report

This section is devoted to dissemination activities that were planned for and conducted in the second project year. These include online dissemination activities (update of the project website, publishing announcements in the project blog and social media, publishing project newsletter and press releases, creation of project videos and demos as well as the Go-Lab MOOC for school teachers, organization of social media competitions, and so on) and offline activities (like organization of workshops and events, presentations for teachers, political stakeholders and other target groups, publishing scientific papers and participation in conferences, organization of joint events together with other projects, etc.). Also, correspondence of taken actions to the initial dissemination strategy (defined in Year 1), Key Performance Indicators are evaluated, and future actions are defined.

2.1 Correspondence to the dissemination strategy

In the Deliverable D9.2 “Report on Dissemination and Exploitation Activities” (M12) general dissemination strategy was defined (see D9.2 Section 2.2). According to this strategy, dissemination activities have to be synchronized with the activities of pedagogical, technical and community clusters supporting and promoting latest developments and upcoming events. Also, the dissemination strategy implies close cooperation of the WP9 with WP6, WP7 and National Coordinators in order to make implementation scenarios, best practices and success stories available for the public.

Table 1 summarizes four dissemination phases (originally defined in D9.2 Section 2.2.3), their correspondence to project phases and activities, actions planned for each dissemination phase, as well as current status of the realization of these actions.

Table 1: Dissemination phases and realization status

Project activities and Results	Dissemination activities	Realization status
Dissemination Phase 1 (M1 – M9)		
First Go-Lab spaces and services specifications, learning spaces specification, specifications of inquiry learning apps, as well as Go-Lab Portal Prototype are available. Visionary Workshops have been conducted.	Creation of the project website, blog, social media channels, and print dissemination materials; dissemination of the first specifications and mock-ups via the website; support of the Visionary Workshops (e.g., creation of workshop flyers, announcements on the website); announcement of Go-Lab news in the online channels; getting started with active use of the project blog and social media.	Dissemination Phase 1 is successfully concluded. Project website (incl. links to prototypes), blog, and social media are available and actively used. Dissemination materials have been created. News and upcoming events (like Visionary Workshops and other teacher events) are promoted via online dissemination channels.
Dissemination Phase 2 (M10 – M24)		
Curriculum analyses, preliminary classroom scenarios, requirements analyses and services specifications, as well as Go-Lab invento-	Dissemination of the project results via online channels; support of the workshops and implementation activities (e.g., dissemination materials, announcements); press re-	Go-Lab online community increased the number of its members by 7 times; online channels are actively used (more than 1,400 posts by Go-

ries (scientific organizations and universities) are available; Go-Lab Portal (pilot and initial versions) is released; evaluation and validation "dashboard" tool is available. Implementation Phase A is running; Practice Reflection Workshops in 10 countries are conducted.	lease; creation of an official project video or a smart show; creation of workshop videos to be made available online; active use of the project blog and social media (e.g., publishing of short scientific notes, initiating discussions, etc.); contributions to external websites and blogs, publishing of scientific papers, participation in conferences and exhibitions.	Lab and 560 actions by users; 44 blog posts); dissemination materials were printed and shipped to the partners; Go-Lab Smart Show, two demo-videos (Go-Lab Portal and an online lab), and one implementation video (Go-Lab at school) were created; more than 100 dissemination events reaching 5,731 participants; 10 press releases in external portals and newsletters; 16 publications.
Dissemination Phase 3 (M25 – M40)		
Go-Lab classroom scenarios handbook is available; inquiry learning apps, Go-Lab services, and final version of the Go-Lab Portal are released; Go-Lab inventory (external and partner organizations) is available; evaluation of the Go-Lab Portal initial version is done. Implementation Phases B and C are running; Practice Reflection and Summative Workshops are conducted.	Dissemination of the project results via online channels; conducting webinars; support of the workshops and implementation activities; publishing of scientific papers and participation in conferences and exhibitions; dissemination of the implementation and evaluation results, experience reports, and best practices (contributed also by external stakeholders, e.g., most active teachers and the so-called "power-users"); promoting the Go-Lab Bartering (Tutoring) Platform.	-
Dissemination Phase 4 (M41 – M48)		
Sustainable version of the Go-Lab Portal is released; integrated validation and evaluation report and recommendations are available; recommendations for the introduction of online labs in schools are available. Implementation Phase C is completed.	General dissemination activities (see Phases 2 and 3); dissemination of implementation recommendations; preparation of the project results exploitation (the Go-Lab Portal, particular online labs, ILSs, Bartering (Tutoring) Platform, pedagogical scenarios and guidelines, etc.); support of the teacher community ensuring its sustainability after the project time; ensuring cooperation sustainability (e.g., accessibility of external labs via the Go-Lab Portal and Bartering (Tutoring) Platform).	-

As one can see from the table, dissemination activities of the second project year correspond to the defined plan and provide a good basis for the third dissemination phase concentrating on the support of Teacher Community, promotion of available project results and preparation of actions supporting sustainability and exploitation of these results.

2.2 Online Dissemination Activities

The Go-Lab Project uses its own and external online dissemination channels to promote the project and to attract stakeholders to active participation in its activities. Go-Lab takes proactive position by providing information on the website and in the project's social media channels, and by addressing its target groups via websites, blogs and in communities used by the stakeholders. Further, Go-Lab organizes social media contests targeting school teachers and other stakeholders with the aim to attract their attention to online community activities and to assure their active involvement. This section describes updates in the projects' dissemination channels (compared to M12 documented in D9.2) and provides an overview of online activities taken in the Year 2 as well as statistics.

2.2.1 Project website and blog

The project website (www.go-lab-project.eu) is the main dissemination channel used by the project, as it reaches all identified target groups. It provides general information about the project, the Go-Lab Portal, pilot activities, and available results, and serves as a connecting point for the social media channels. The project blog integrated in the website (and available via the "News Blog" button on the right of the homepage and at most of other pages) informs stakeholders about the latest news, for example, new developments, teacher materials available, impressions from past events, and so on. Consortium partners contribute short articles which are published in the blog by IMC. Currently, the blog contains 44 articles.

A detailed description of the Go-Lab website including description of the website structure and navigation, main content types, as well as Content Management System is provided in the deliverable "D9.1 - Project Website and Dissemination Materials" (M6). Deliverable D9.2 "Report on Dissemination and Exploitation Activities" (M12) gives an overview of the website status by the end of Year 1.

In the time period between M13 and M24 the following updates have been made:

- The "Online Labs" area was renamed in the "Go-Lab Portal" (http://www.go-lab-project.eu/go-lab-portal) and the content of the related pages ("Go-Lab Portal", "Online Labs", and "Inquiry Spaces") was updated explaining particular content types and representing examples (see Figure 1 for a screenshot of the "Go-Lab Portal" page). Access to the Go-Lab Portal is provided with the button "Go-Lab Portal" on the right, which is available at most of the website pages.
- Additionally, the "Research" area of the website now includes a subpage representing the Inquiry Learning Cycle (http://www.go-lab-project.eu/inquiry-learning-cycle), supporting deeper understanding of the inquiry learning process and the ILS-structure by the website visitors.
- In the "Teachers" area Call for Pilot Schools is represented including country-specific subpages in multiple languages (http://www.go-lab-project.eu/call-for-schools, described in D7.1 "Pilot Sample Profile – V1" (M18)). The page is kept up-to-date according to the progress of pilot activities. Further, a sub-page devoted to the Go-Lab Mini Video contest has been created (http://www.go-lab-project.eu/go-lab-summer-mini-video-contest, see Section 2.2.7 for details about the contest). All materials relevant for the teachers and mentioned and linked on the particular pages are also listed and available for download in the "Download" area of the website.

- In the "Partners" area several updates were implemented. Firstly, a "Project Coordinators" sub-page was created representing the list of project and national coordinators and providing their contact information (http://www.go-lab-project.eu/project-coordinators). Secondly, new "Advisory Board" page represents the members of the Advisory Board providing their short CVs and contact information (http://go-lab-project.eu/advisory-board). Finally, the "External Partners" page was updated during the year and now contains seven partners collaborating with Go-Lab on different topics.
- Moreover, Go-Lab Smart Show (see Section 2.2.6 for details) created in the second project year is represented on the right of the homepage and at most of text pages.
- Finally, all texts represented on the website were revised and updated, if it was needed.

Figure 1: Go-Lab website: Go-Lab Portal page

In the period from the 1st November 2013 to the 28th October 2014 the website was visited by 20,358 unique visitors[2] (according to the DoW, at least 3,000 unique visitors in the second project year were planned) coming from Spain (12%), United States (12%), Portugal (10%), United Kingdom (8%), Greece (7%), Germany (6%), Romania (5%), Estonia (4%), Italy (4%), Belgium (3%), India (3%), Netherlands (2%), Austria (2%), Switzerland (2%), and other countries (see Figure 2).

67% of visitors are new, and 33% are returning visitors.

[2] Website developers and content managers from IMC are excluded from the statistics.

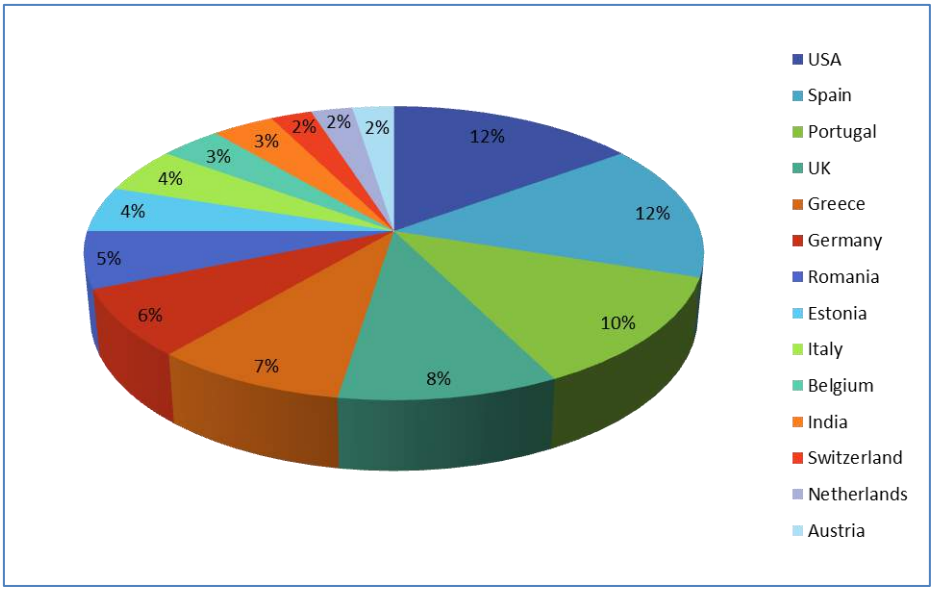

Figure 2: Go-Lab website unique visitors by country (Year 2)

Interestingly, the distribution of website sessions by country does not exactly follow tendencies of the first project year (see Figure 3). For example, USA, Portugal, and Spain show a significant growth of visitors (5 to 7 per sent compared to previous year), as well as UK, Romania, Italy and Austria, which increased the number of sessions by 2% each. This can be explained by establishment of cooperation with US online lab providers (like PHet, which labs became a part of the Go-Lab Portal and STEMfinity listing the Portal at their page representing free STEM resources), as well as active offline dissemination carried out in Portugal (which is kind of "dissemination activity leader" among other countries), Spain and other pilot countries. Small changes by other countries can be explained by structural changes in the distribution.

Figure 3 represents distribution of website sessions in different countries in Year 1 and Year 2 representing structural changes described above. (The graphic considers only those countries contributing 2 or more percent of the website sessions. In Year 1 these made up 66% of all sessions, in Year 2 – 80%).

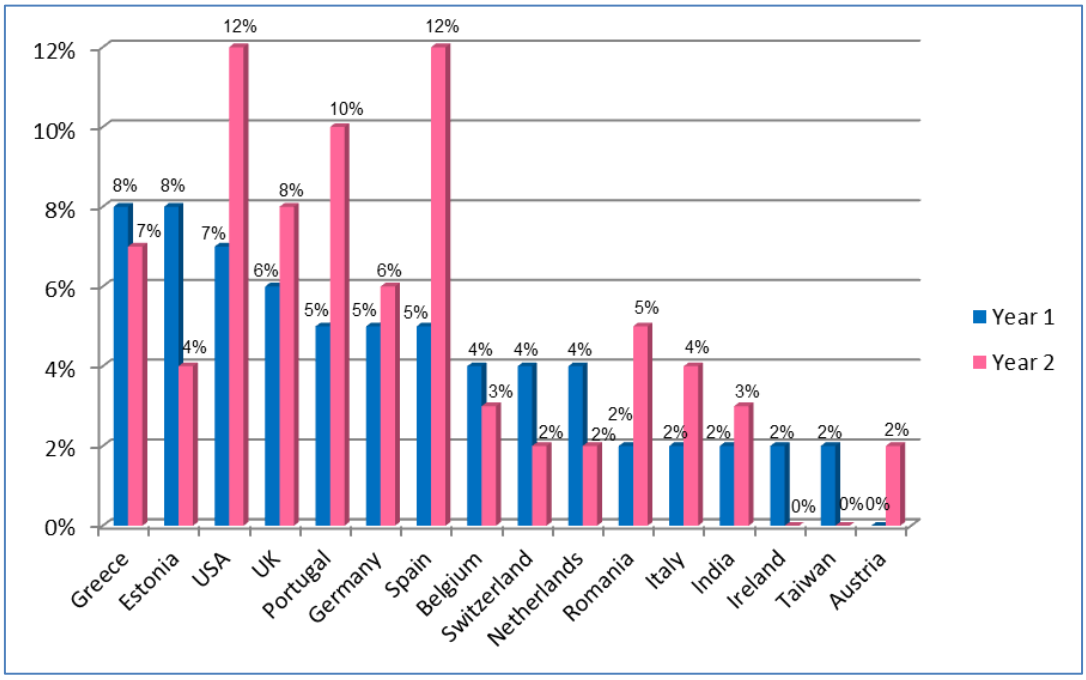

Figure 3: Website session distribution by country in Year 1 and Year 2

Figure 4 represents the number of unique visitors who accessed the website in the second project year (01.11.2013-28.10.2014) as well as the number of new sessions. As one can see from the chart, visitors' activity on the website increased at the beginning of January and remained high in January and February, as the first Call for Schools was announced: the highest peak on the chart corresponds to Monday, January 6th. Another peak from 28th of April is connected to dissemination activities (first of all e-mailing) in Germany, as most of the users come from Bayern, and the peaks from end of June to beginning of July – to publication and dissemination of the second Call for Pilot Schools. Finally, high activity at the end of September (especially at 25th September – more than 200 users) can be explained with dissemination and implementation activities in Greece, UK, Austria and other countries.

In general, the website visits as well as the estimated percentage of the first time visits (% New Sessions) are uniformly distributed over the time period (the lowest points of the curve represent weekends), which confirms continuity of project dissemination, community building and implementation activities conducted by all consortium members.

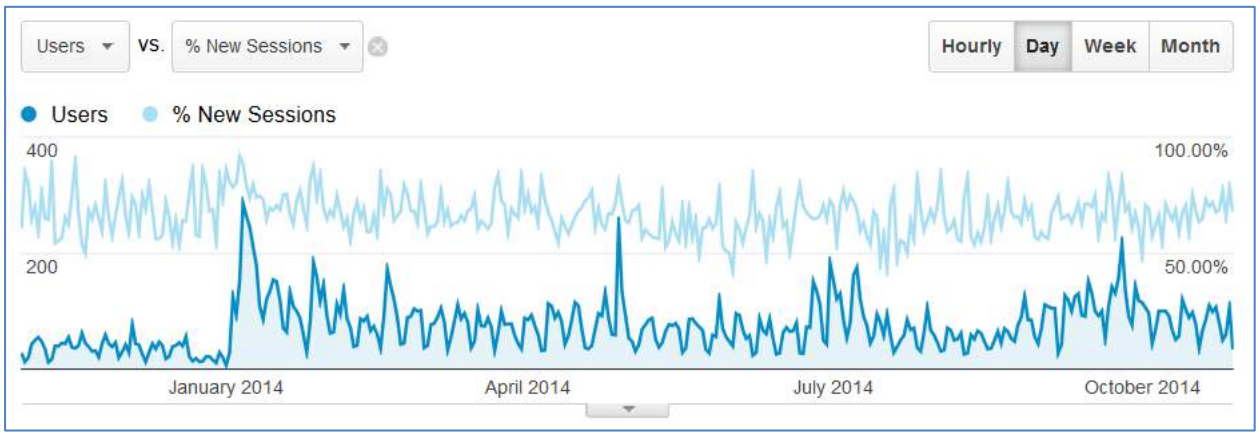

Figure 4: Visits of the Go-Lab website (Year 2)

The traffic sources are represented as follows: 40% organic search (users searching for "go lab", "go-lab", "online science labs", and so on), 26% direct traffic (users clicking direct links to sub-pages, e.g., provided in dissemination materials or online channels), 25% referral traffic (users are redirected from other websites, e.g., https://scientix.eu, https://eun.org, https://europeanschoolnetacademy.eu. https://esa.int and https://golab.ea.gr), and 8% social media traffic (most of the users come from Facebook and Twitter). The contents are mostly shared by e-mail (58% of sharing actions), Facebook (24%), and Twitter (11%), which means that most of the users send information directly to their contacts.

Figure 5 represents the Users Flow on the Go-Lab website providing an overview of traffic sources, landing pages, as well as first and second interaction pages. Approximately 50% of the users[3] land at the homepage; 23% of the users exit the website here. Further 15% land at the "Go-Lab Portal" page (previously "Online Labs" page) and approximately 20%[4] (ca. 6,000 users) leave the website here during the first two interactions (ca. 4,000 users continue to the Golabz Repository, see Section 2.2.2). Finally, some 11% of the users land at the "Call for Schools" page or it sub-pages and 5% exit the website here (probably following the link to the application form). In average, a website session lasts about 3 minutes 18 seconds in which a user views in average 3 pages. Thus, the Go-Lab website is perceived by the users as an overview and a "take-off area" to the Repository and Pilot School application form.

[3] In the Users Flow, Google Analytics calculates sessions (not unique visitors). In this paragraph we use the term "users" for convenience, although sessions are meant.
[4] Including users who have landed at this page or come to this page from other pages within the website.

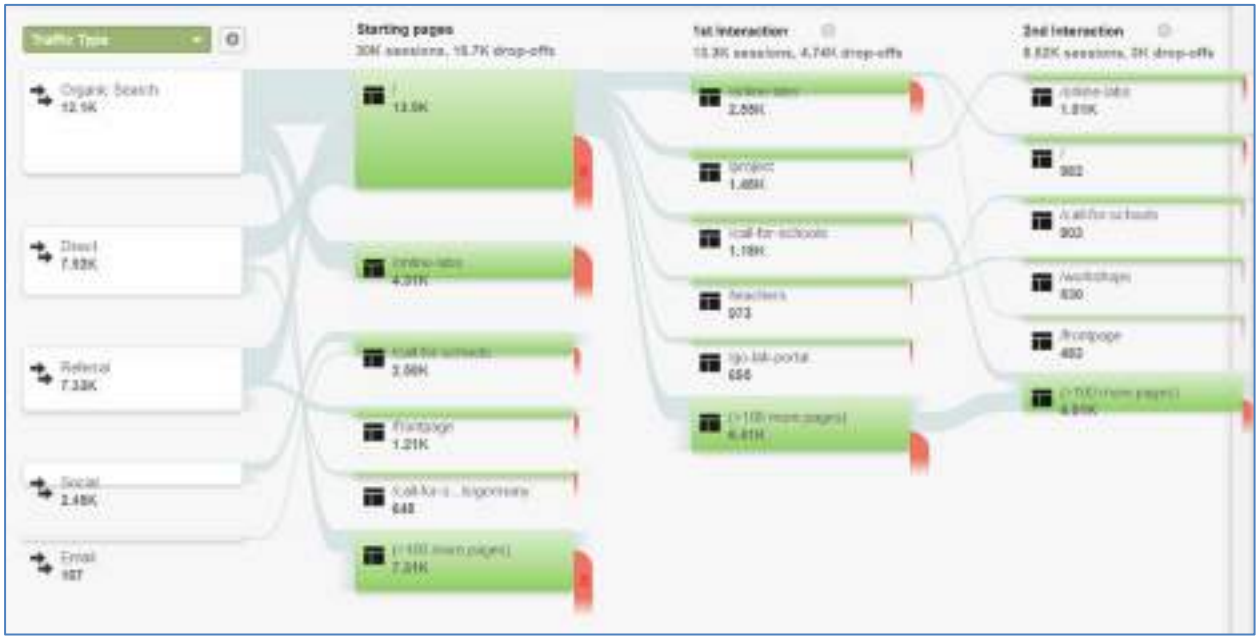

Figure 5: Users Flow on the project website (Year 2)

2.2.2 Golabz Repository

The Go-Lab Repository (Golabz, www.golabz.eu) is a part of the Go-Lab Portal representing a list of online labs and tools for inquiry learning provided by the consortium members and cooperation partners. The development of the Golabz Repository is documented in the Deliverable D5.2 “Specifications of the Go-Lab Portal and App Composer” (M12). In the Deliverable D9.3 (this section) we concentrate on the usage statistics and connection of the Repository with other elements of Go-Lab dissemination infrastructure.

In the time period from the 1st November 2013 to the 28st October 2014 Golabz was visited by 7,307 unique visitors (excluding the developers from IMC). 49% of these users are new visitors and 51% are returning visitors.

Figure 6 represents the usage statistics of Golabz. As one can see from the chart, the number of users constantly grows. The peaks correspond to dissemination activities at the beginning of April (EDUCON conference 3-5 April 2014, teacher workshop in Enschede, Netherlands, 11-15 April 2014), Go-Lab Summer School (13-18 July, Marathon, Greece), as well as multiple dissemination and implementation events in September and October (Go-Lab presentation at GTTP international teacher event in Portugal, presentation during Scientix meeting in Belgium, presentation during Astronomy Education Alliance Meeting in Portugal, e-masterclasses in Greek schools, presentation at Scientix Conference in Belgium, and others).

Figure 6: Golabz usage statistics (Year 2)

An average session in the Repository lasts 6 minutes 15 seconds, approximately 5.5 pages pro session are viewed (see Figure 7). The most viewed pages are the homepage, main pages “Online Labs”, “Apps” and “Inquiry Spaces”, online lab pages “HY.P.A.T.I.A”, “Methyl Orange”, “Splash”, “Electricity Lab”, “Weblab Deusto Aquarium” and “Red Lab”, as well as app pages “Go-Lab Concept Mapper” and “Hypothesis Tool”. An average time per page is 1 minute 22 seconds (for online lab and app pages about 2-3 minutes), which means that the users get an overview and then continue to the next page or switch to the Go-Lab Portal (the Bounce Rate per page is relatively low with an average of 33%, which means that the most users don’t leave the website without interaction, but proceed further using a link or a button).

The traffic sources in the Repository are represented as follows: 36% direct traffic, 36% referral traffic, 24% organic search, and 3% social media traffic (see Figure 7).

Default Channel Grouping	Acquisition			Behaviour		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
	14,313	51.05%	7,307	33.26%	5.55	00:06:15
Direct	5,221	44.17%	2,306	32.37%	6.42	00:07:45
Referral	5,212	57.44%	2,994	27.51%	5.43	00:05:31
Organic Search	3,484	53.04%	1,848	43.25%	4.40	00:05:06
Social	396	40.15%	159	32.83%	5.62	00:06:29

Figure 7: Golabz Repository traffic sources (Year 2)

By the referral traffic, most of the visitors come from the Go-Lab project website (78% of all sessions, which is 4,071 sessions) and Go-Lab page of EA (https://golab.ea.gr, 4% of the sessions). There are also some users coming from the Scientix website (https://scientix.eu), Learning Lab eTwinning website (learninglab.etwinning.net), Go-Lab Summer School website (https://golab2014.ea.gr), the website of NUCLIO (https://nuclio.org), Graasp (https://graasp.epfl.ch), and Open Education Europe portal (https://openeducationeurope.eu).

2.2.3 Social media channels

In order to support communication between the project and the users and to support community building activities, Go-Lab provides social media groups and pages, as well as content sharing channels on the following social media platforms:

- Facebook Group: www.facebook.com/groups/golab.project
- Facebook Page: www.facebook.com/GoLabProject
- Google+ Group: plus.google.com/u/0/communities/103544792011493828793
- LinkedIn Group: www.linkedin.com/groups?gid=4946895&trk=myg_ugrp_ovr
- Twitter Channel: twitter.com/GoLabProject
- YouTube Channel: www.youtube.com/user/GoLabProject
- SlideShare Channel: www.slideshare.net/GoLabProject
- Flickr Channel: www.flickr.com/photos/go-lab-project

Facebook[5], Google+, and LinkedIn groups are used to publish the latest project news and announcements, as well as to facilitate the discussion between the project members and external

[5] There is also a Facebook page: this is a kind of „landing“ page on Facebook providing information about the project. This page can be “liked” and “shared”, whereas a group can only be “joined”.

stakeholders on project relevant topics. Facebook is mostly used by teachers and people working with teachers, whereas LinkedIn provides an opportunity to find technology and dissemination partners. Google+ has quite mixed auditory. Additionally to the main project groups, an Estonian Facebook group[6] and two Facebook groups for Go-Lab Summer School participants[7] (in Volos, 2013, and Marathon, 2014) are available. Social sharing platforms (YouTube, SlideShare, and Flickr) are used to provide videos, presentations, and photos in the web, sharing, commenting, and discussing them. Twitter distributes project messages in the form of micro content containing mostly the main topic and a link.

As of 28nd October 2014, the project Facebook page counts 332 "likes". The main Facebook group has 376 members (347 of them are project external). The Google+ and LinkedIn groups currently have 45 (30 external) and 63 (46 external) members accordingly. The Go-Lab Twitter channel has 289 (most of them project extern, no exact information) followers and follows 114 members (individual and organisational). SlideShare (11 followers, 8 of them project extern), Flickr (7 followers; not known if project extern), and YouTube (38 followers; not known if project extern) are not as actively used, as most of the content is published in the communities.

Figure 8 represents the number of users joining Go-Lab project communities and following the project in the social sharing channels (the total numbers are represented; no differentiation between project external and internal users). As one can see from the figure, the number of Go-Lab followers has significantly increased compared to the first project year. 73% of the users (in all communities and channels) joined Go-Lab in the second project year.

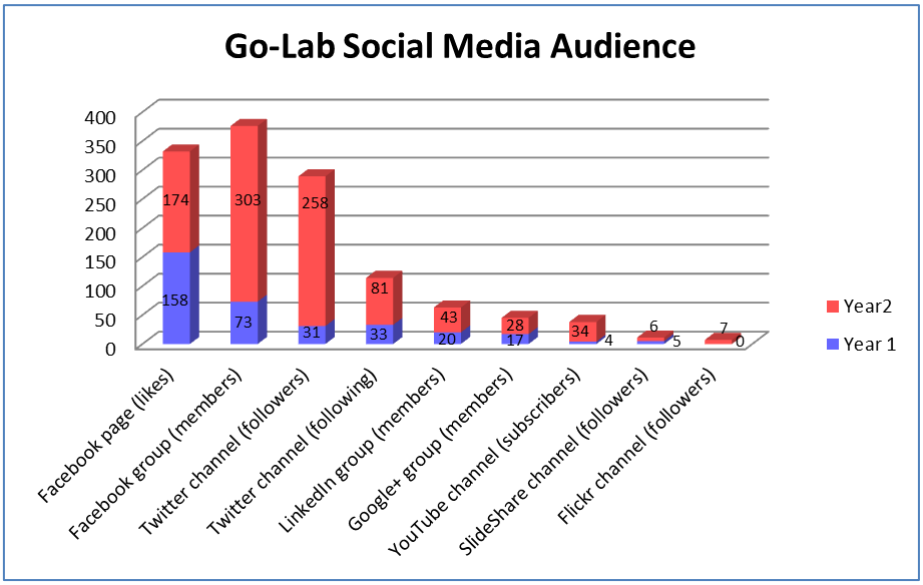

Figure 8: Go-Lab Social Media Audience (Year 1 vs. Year 2)

Go-Lab publishes its contents in the social media channels several times a week announcing upcoming events and publishing pictures and impressions from past events. As of 28th October 2014, project Facebook page counts 38 posts (only main information about the project is published here; also, this page hosts Go-Lab Mini Video Contest – see Section 2.2.7 for details), Facebook group – 253 posts, Google+ group – 138 posts, LinkedIn group – 28 posts (only the most important information is published here), YouTube channel – 41 shared videos and 10

[6] Estonian Facebook group: https://www.facebook.com/groups/golabe
[7] Facebook groups for Summer School participants: https://www.facebook.com/groups/615756051790568 and https://www.facebook.com/groups/1449374291994271

own uploads, SlideShare channel – 2 presentations, Flickr channel – 13 albums (173 pictures). Go-Lab Twitter channel currents counts 1,169 tweets and retweets[8].

Figure 9 represents social media content statistics, including the number of posts in the Year 1 and Year 2. 86% of the content was published in the second project year.

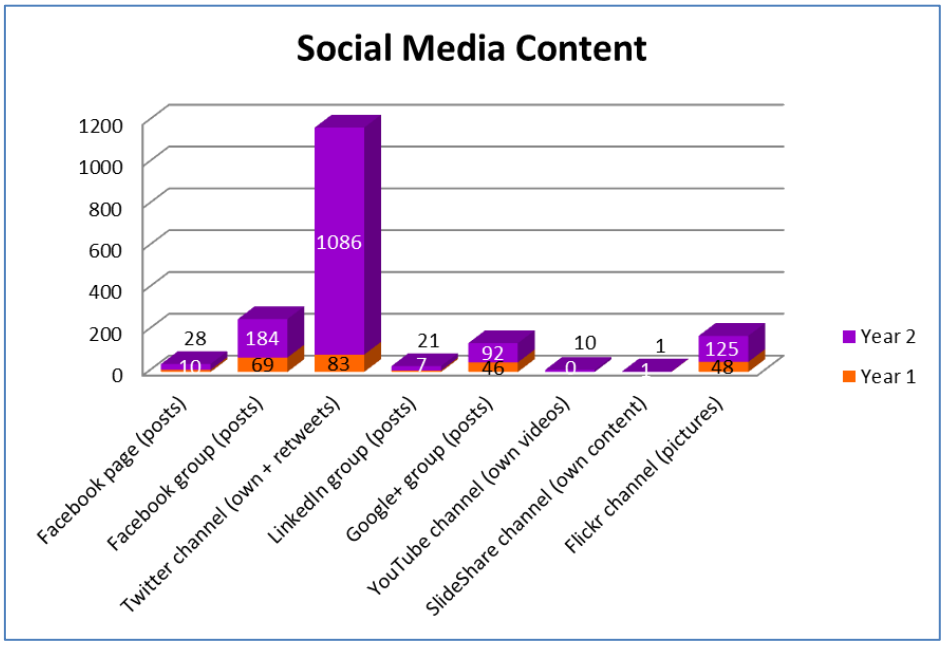

Figure 9: Social Media Content Statistics (Year 1 vs. Year 2)

As one can see from statistics, project social media channels are actively used to distribute messages about the latest news and upcoming events. Most of the posts are published by the project members. By project external members, 17 discussions were started in the Facebook group and 6 in the LinkedIn group. Also, the project was mentioned in tweets of other users 97 times (projects' tweets were retweeted and liked multiple times, however, and exact number is not available). 5 direct contact requests via private messages (e.g. questions about the project, participation in pilot activities, and so on) have been received on Facebook.

In order to increase activity of community members, the Go-Lab started a Mini Video Contest asking social media users to create and upload short videos explaining the project (see Section 2.2.7 for details). Other interactive activities will be designed and conducted during the third and fourth project years.

Besides its own social media groups, Go-Lab publishes some of its announcements in about 50 Facebook and Google+ groups, for example, (e)Learning (988 members)[9], eSchoolsVienna (97 members)[10], schule.vernetzt.österreich.redaktion (168 members)[11], Science Teachers in Europe (1,494 members)[12], Teaching Online – Facilitating Online Learning (4,640 members)[13], Science for Kids (11,028 members)[14], STEM Educators (9,630 members)[15], Teachers helping Teachers (6,776 members)[16], and others.

[8] Cumulative numbers. Separated values for both years are represented in the Figure 9.
[9] (e)Learning group: https://www.facebook.com/groups/372399666132684
[10] eSchoolsVienna group: https://www.facebook.com/groups/eschoolsvienna
[11] schule.vernetzt.österreich.redaktion group: https://www.facebook.com/groups/156304074415242
[12] Science Teachers in Europe: https://www.facebook.com/groups/ScienceTeachersEurope
[13] Teaching Online: https://www.facebook.com/groups/372438642805998/
[14] Science for Kids: https://plus.google.com/u/0/communities/110227751651106614300
[15] STEM Educators: https://plus.google.com/u/0/communities/112904336188381403474
[16] Teachers helping teachers: https://plus.google.com/u/0/communities/113166595976911311283

2.2.4 Project newsletter

A quarterly newsletter (registration link: http://www.go-lab-project.eu/newsletter) informs interested stakeholders by e-mail about the latest project achievements, new scenarios, technical developments, new features, upcoming and past workshops and events, as well as cooperation and participation possibilities, new partnerships with projects and organizations, etc. The newsletters are also available for download in the Download area of the website (http://www.go-lab-project.eu/download-material).

Importantly, this registration form helps to gather information about the stakeholders interested in the project, such as country, business sector, occupation, etc., which can be used to make the newsletter content more target group specific. As of 28th October 2014, there are 172 project external recipients of this newsletter (compare to 34 recipients by the end of Year 1). Most of the recipients come from Spain (21%), followed by Portugal (18%), Romania (8%), Italy (6%), Greece (7%), Germany (6%) and the Netherlands (6%). Other European countries count 1-2 percent of the recipients each, which is in the sum 22% of all recipients.

Figure 10 represents the newsletter recipients by country (for leading countries) and region.

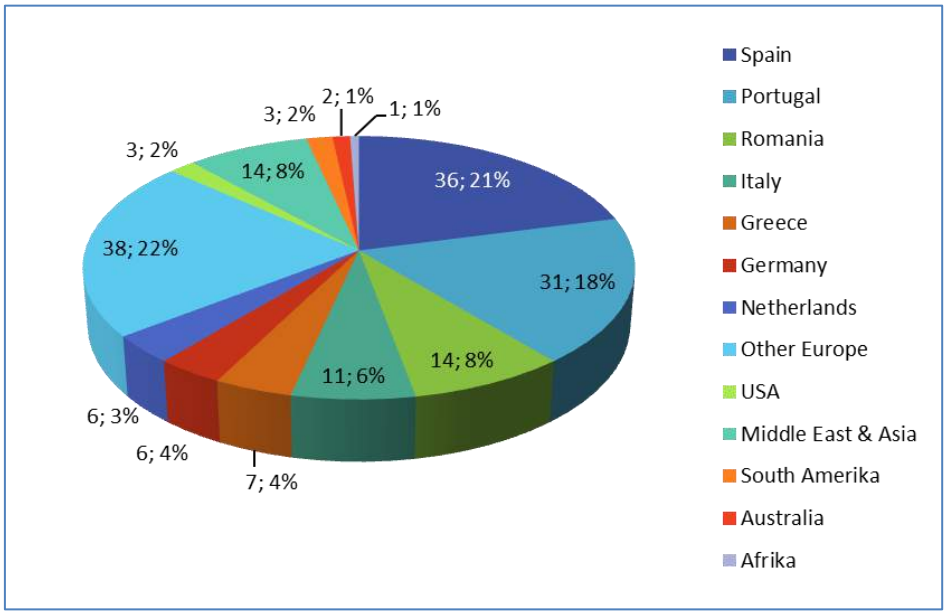

Figure 10: Newsletter recipients by country and region (Year 2)

83% of the recipients work in Education, Training and Library sector, as well as in Science and Research (9%) and Information Technology (3%) sectors. Most of the recipients are teachers and educators interested in receiving news about the pilot activities, new teacher tools and materials, as well as workshops and events.

2.2.5 External channels and online press releases

Besides its main dissemination channels, the Go-Lab project uses also other online dissemination media. In the Year 2, four external sites were used for dissemination and publication of the developments within the project.

Open Education Europa portal (OEE, www.openeducationeuropa.eu) was mainly used to promote the first pilot activities of the project and the availability of the repository for all educators. Moreover, collaboration with the OEE portal was offered by their team since both OEE and the Go-Lab project follow similar goals and share similar values. Apart from a logo exchange on the homepages, further actions to promote Go-Lab through social media and newsletter and by adding and sharing even more content on the OEE Portal were mentioned.

On the website of eLSA (eLearning im Schulalltag, http://elsa20.schule.at) Go-Lab pilot activities and Go-Lab Teacher Contest were promoted for Austrian schools. Further, Go-Lab Call for Schools and online workshops were announced on the website of Scientix community (http://www.scientix.eu). Finally, two articles about Go-Lab activities for students were published on the website of CERN (http://home.web.cern.ch/students-educators).

Go-Lab project, its pilot activities, and the Repository were also promoted in the newsletters of EUN[17] and USW (both counting thousands of recipients, most of whom are teachers), and in the newsletter of IMC mostly targeting users of educational technologies from different sectors, which was also published on the company's website[18].

2.2.6 Go-Lab Smart Show and videos

During the second year, an official Smart Show was created by the Go-Lab team to promote the project and explain its main ideas. Subtitles in different languages were added to the videos, including Dutch, English, Estonian, German, Greek, Russian and Spanish. The videos are available to the public on the official Go-Lab YouTube channel[19] and on the right side of the homepage and of each text page on the project website.

According to the YouTube channel statistics, as of 28th October, the original Smart Show was viewed up to 878 times. The other versions some have lower rates: German - 114, Spanish – 11, English - 62, Greek - 63, Dutch - 42, Russian – 28, and Estonian - 14 views accordingly. All videos were promoted through Facebook, Twitter, Google+, and LinkedIn, as well as in the Project Blog and Newsletter.

Besides the Smart Show, two demo videos were created. They are also available on the Go-Lab YouTube Channel. The first demo video[20] demonstrating the Go-Lab Portal was made available online in February and it was viewed over 200 times by 28th October 2014. The video demonstrates how the Portal works, it mentions the highlights of the Golabz Repository and it explains in detail how one can create an own Inquiry Learning Space. The second demo video[21] demonstrates the virtual buoyancy laboratory "Splash!" in which students can learn about Archimedes' Principle simulating an experiment using liquids with different densities and objects made of different materials. This video is online for two months and it was viewed by the public more than 115 times (as of 28th October 2014).

In addition, CERN created a video named "Educational Fieldtrips at the World's Largest Laboratory" documenting the educational field trip to CERN by high-school students of Ellinogermaniki Agogi and demonstrating a methodological approach structured into three steps that other schools can follow in order to get the most out of the CERN experience, as one of the Go-Lab activities. The video is available in two versions (short[22] and long[23] ones) and mentions that the explained approach as well as creation of the video is supported by Go-Lab.

[17] See EUN Newsletter archive: http://us6.campaign-archive2.com/?u=fcaa73d53911340a72d92d73f&id=c075fc49f0&e=[UNIQID]
[18] See English version here: http://www.im-c.de/en/up-to-date/imc/press/press-releases/press-releases-single/article/golabz-a-repository-for-online-laboratories-interactive-apps-inquiry-learning-spaces/
[19] Go-Lab Smart Show with subtitles in seven languages: http://www.youtube.com/playlist?list=PL3dXIbhOPsPmgBWxcp0dAjdLOAdeTQo-V
[20] Go-Lab Portal demo video: https://www.youtube.com/watch?v=Igkv0poqIdU&list=PL3dXIbhOPsPmve49iq5eMwHWPlf_-9jTW
[21] "Splash!" online lab demo video: https://www.youtube.com/watch?v=3VZYEqJAshc&list=UUcpdFl6jIiRM5oRSIE-LYvw
[22] CERN video, short version: https://cds.cern.ch/record/1690590?ln=en
[23] CERN video, long version: https://cds.cern.ch/record/1743143

2.2.7 Go-Lab Mini Video Contest

In the second year, an additional promotional activity was designed in order to facilitate involvement of the social media users in the project[24]. The video contest "Go-Lab Summer Mini Video Contest" started August 5th, 2014 inviting community members to submit short videos explaining the project. Potential participants were asked to create 90-120 seconds long videos explaining the idea of Go-Lab in an easy and inventive way (e.g., explaining how the Go-Lab Portal works and how to use it for teaching science at school). It was asked to record the video in English or to provide subtitles if recorded in other languages. After recording, the video had to be uploaded to YouTube and the YouTube-link could be used to submit the video at the official Facebook page https://www.facebook.com/GoLabProject hosting the competition or using the direct link to the contest provider: http://woobox.com/j9nhiz[25].

The technical support and tools were provided by Woobox (www.woobox.com) offering multiple online tools to increase the number of followers (especially on social media channels like Facebook) and strengthen marketing activities. Using Woobox tool for conducting video contests, Go-Lab contest could be integrated into the Facebook page of the project. Non-Facebook-users were able to participate by using the direct link mentioned above. Advantages of using Woobox are an advanced user interface for submitting videos and voting, as well as tracking of votes allowing to avoid multiple voting by one user.

The first three winner videos (according to the results of social media voting) were planned to be awarded with Amazon vouchers (in a value of 150, 100 and 50 Euros for the 1st, 2nd and 3rd places accordingly). Participants were able to submit their videos until August 31st and the voting was possible until September 14th. By the end of the submission period, three videos had been uploaded. Two participating videos had to be disqualified as the videos didn't meet the contest requirements. The winner video (http://youtu.be/slaF-QfvSh8) created by Elena Vladescu, a teacher from Romania, and explaining Go-Lab in a nice animation met all requirements and received the most votes (46 votes).

Figure 11: Screenshots of the video by Elena Vladescu

[24] This section does not describe Teacher Contest "Teaching Through Inquiry", as it is a WP6 activity documented in the Deliverable D6.4 Report on the participatory engagements activities (M24)

[25] See more information about the submission format, important dates, etc. in Terms and Conditions of the Go-Lab Mini Video Contest: http://www.go-lab-project.eu/sites/default/files/files/download_material/file/OFFICIAL%20RULES%20-%20Go-Lab%20Summer%20Mini%20Video%20Contest.pdf

Such low engagement of the community members (only three participants) can be explained by two reasons. Firstly, the Contest was conducted during the holiday and vacation time, which means that many people didn't access their e-mail boxes and social media accounts or just didn't have time to create a video. Secondly, as we found out after the competition, Amazon is represented only in several European countries (Germany, Austria, France, Italy, Spain, and UK). Although Amazon vouchers can be used also by the users from other countries, not all goods can be shipped, which makes the prize (voucher) not attractive.

Go-Lab plans to repeat the contest in 2015 considering vacation and holiday times and offering other prizes in order to increase the number of participants.

2.3 Go-Lab MOOC

Go-Lab creates a Massive Open Online Course (MOOC) "Using online labs in the classroom: an introductory course for teachers" introducing science teachers to inquiry learning methods and training them in creating lesson plans and using the Go-Lab Portal and online labs (four inquiry learning scenarios are represented). The course targets teachers, who are not able to attend presence workshops (e.g., because of time and financial reasons, or if they come from countries not covered by Go-Lab implementation activities). Also, teachers who have participated in a Go-Lab workshop may want to refresh their knowledge or get some additional information. The course can be useful for any people interested in inquiry learning and online labs, e.g., scientists, online lab providers, and educational providers. Thus, the course will support dissemination of the project among teachers and general public. Further, the MOOC will help gather feedback from teachers regarding their experience with the Go-Lab Portal and online labs (with help of feedback and self-reflection forms). Finally, the course participants will join Go-Lab community participating in other project activities offered by WP6 and WP7.

2.3.1 Aims, format and structure of the course

Participation in the Go-Lab MOOC requires registration on the MOOC-platform (OpenCourseWorld (OCW), www.opencourseworld.de) and registration to the course, which will have fixed start and end dates. Further, participants need to have an account in the Go-Lab Portal in order to be able to conduct practical activities.

The course will be offered several times a year during and after the project time.

Main goals of the Go-Lab MOOC are the following:

- To provide general information about the project and inquiry learning methods
- To explain pedagogic background of using online labs in the classroom
- To provide participants with hands-on experience of creating lesson plans and inquiry learning spaces to support these plans
- To train participants in using the Go-Lab Portal
- To train participants in using selected online labs
- To motivate teachers to use Go-Lab in their everyday teaching practice
- To provide teachers with video and text tutorials they can get back to
- To gather participants' feedback concerning the use of the Portal and online labs
- To understand at which stages or with which tools the teachers might face difficulties
- To define necessary supportive materials to be created

The first version of the course (there will be another extended and updated version which will be available after the project time) consists of six modules; each of which lasts one week (the course can be also offered in a compact mode with two modules per week). The first two modules are more theoretical introducing teachers to inquiry learning, the Go-Lab Portal and online labs represented in the course. The other four modules are very practice-oriented. Each of them

represents one scenario and online labs used, and offers a practical activities (e.g., to create a lesson plan and an inquiry learning space using the labs offered).

For the first run of the course, online labs and tools which are already ready to be used[26] have been selected. These are HY.P.A.T.I.A, the Faulkes Telescope, Galaxy Crash, Sun4All, and Weblab-DEUSTO Aquarium (Aquarium's new interface is being developed and will be available soon). Further, SalsaJ (which is not an online lab, but a tool to be installed on computer) and an external (non-Go-Lab) online lab SOHO have been chosen, as they are used by Astronomy teachers together with Sun4All lab to support one lesson plan.

Additional course modules representing further inquiry learning scenarios and using other online labs (first of all, in subject domains which are not represented in the first version of the course, like Chemistry, Biology, etc.) will be added after the first run of the course and receiving users' feedback. After the new course modules are available, participants will be able to choose and study several modules they are interested in (not completing all modules offered).

Table 2 represents an overview of the course modules and online labs used for the first course version, as well as project partners responsible for creation of particular modules. IMC (not represented in the table) carries out general coordination of the MOOC creation and is responsible for the design of the course as well as course implementation at the OCW-platform.

Table 2: Overview of the Go-Lab MOOC Modules

Module Nr.	Module name	Online Labs	Responsible partner
1	Inquiry Learning with Online Labs	-	UT, EA
2	Creating Inquiry Learning Spaces	Go-Lab Portal with any demo-ILSs	EPFL, EA
3	Archimedes' Principle	Weblab-DEUSTO Aquarium	UDEUSTO
4	Exploring the Sun	Sun4All, SalsaJ, SOHO	NUCLIO
5	Exploring galaxies	Faulkes Telescope, Galaxy Crash	USW
6	Conservation of momentum	HY.P.A.T.I.A.	IASA

Each module contains the following content types:

- An introduction video providing an overview of the module *
- Video lectures (one or several videos/screencasts/demos) *
- Additional reading materials (e.g., video scripts, tutorials, articles, books)
- Practical activity (a task to be completed in the Go-Lab Portal) *
- Discussion forum (participant discussion and questions)
- Peer-assessment (probably form-free as general feedback or discussion)
- Self-reflection and feedback form *
- Quiz (multiple-choice test) *

Completion of activities marked with a star (*) is obligatory to get a Certificate of completion at the end of the course. Collaborative activities (discussion and peer-assessment) are intended to support self-regulated learning activities with experience exchange and mutual support between participants. If needed, an expert or an administrator will answer the most frequently asked questions; however, the course will be constructed so that participants are able to find answers on their own.

[26] Note: the course planning started at the beginning of 2014, so the labs which were available that time are meant.

2.3.2 OCW-Platform and course administration

The Go-Lab MOOC will be offered at the OpenCourseWorld-platform (OCW, http://opencourseworld.de) hosted by IMC. The course will be administrated by IMC (including technical implementation, content management, participant management, issue of certificates, general and technical support). Optionally, the experts, who created particular course modules, may offer tutoring services, e.g., moderating the discussions, supporting and providing feedback to practical activities, offering webinars, etc.

For the Go-Lab MOOC, OCW-platform will be used in combination with the Go-Lab Portal. Figure 12 represents an overview of learning activities at the OCW-platform and in the Portal. As one can see, all theoretical and individual learning activities (e.g., watching video lectures, reading articles, filling in self-evaluation and feedback forms, taking quizzes) will take place at the OCW-platform. Practical activities (using pre-defined ILS, creating own ILSs, peer-review and discussion) will be represented at the OCW-platform as task definitions linked to the Go-Lab Portal, where they will actually be conducted.

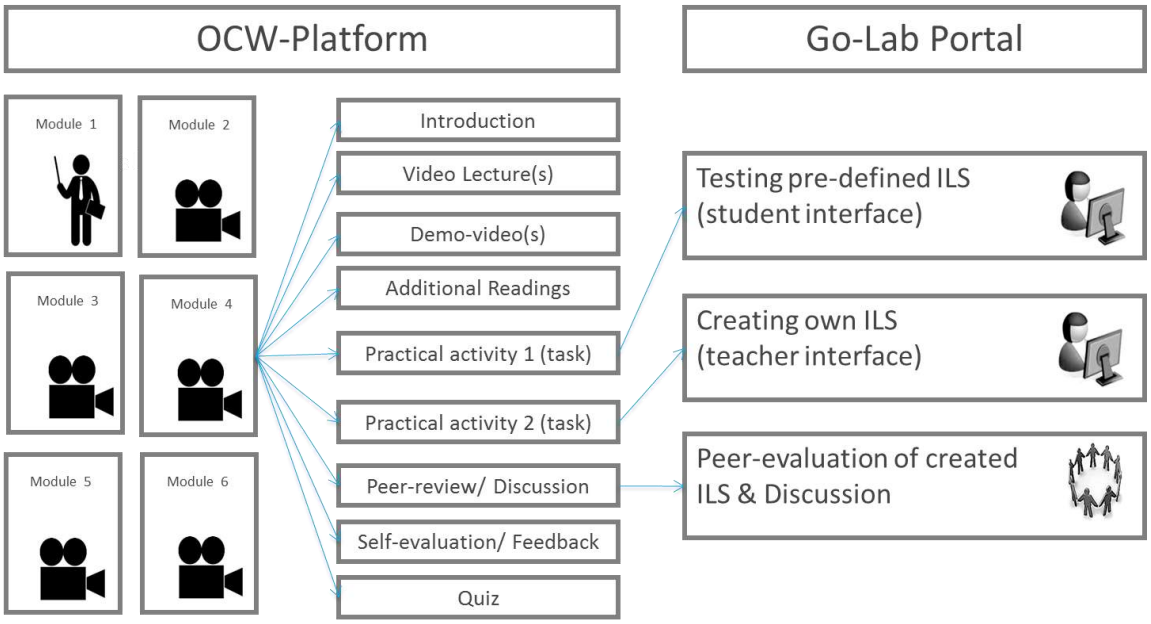

Figure 12: Learning activities at the OCW-platform and in the Go-Lab Portal

Following sub-sections provide an overview of the OCW-platform functionalities.

Introduction page

The course will be represented in the course catalog and provided with an introduction page. The introduction page represents a course description, an overview of available learning activities and materials, the course provider (Go-Lab) and speakers, and offers a possibility to share this information via social media. Figure 13 represents sample introduction page.

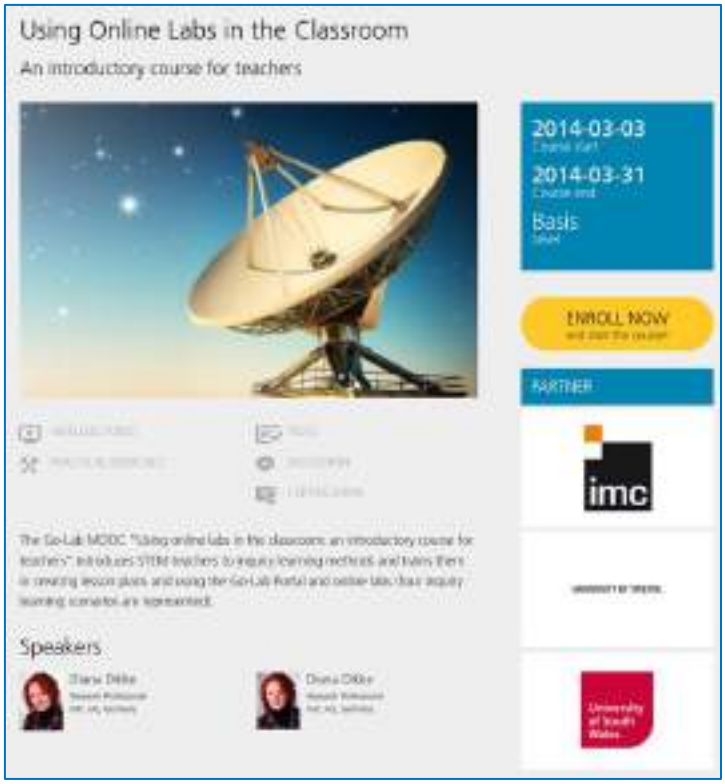

Figure 13: Sample introduction page

Participant interface

The main menu of the participant interface provides access to the course syllabus, general discussion forum, news area, and certificate download area. By clicking on Syllabus, participant can view the course structure and available materials and start studying. All course materials (videos, power point slides, pdf-files, etc.) can be viewed in the same tab or be downloaded for offline use. Materials that have already been viewed are automatically marked with green color. Figure 14 represents sample content page.

Figure 14: Sample content page

E-mail notifications

To the beginning of the course, participants will receive a welcome e-mail inviting them to start with the first module. Each following module will also be announced with an e-mail. To the end of the course, a wrap-up e-mail will be sent. Participants will also be informed via e-mail as soon as certificates are available.

Participant surveys

At the beginning of the course participants will be invited to complete a survey (optionally) and provide us with some information about their background (not all participants will be teachers, there might be also researchers, online lab providers, lifelong learners, and so on), interests, and previous experience with online labs. At the end of the course, a feedback form (evaluating the course organization and materials, not the labs) will be offered.

2.3.3 Content development and update

Creation of the course content has already started and will continue in the third project year. As of October 2014, most of module scenarios and some video lectures have been created. Further video lectures and demo-videos will be created after the new version of the Go-Lab Portal is available (M24). The course is planned to be ready for public in 2015. Before the official launch, a demo-version will be created to be peer-reviewed by the consortium members and improved, if necessary. After the course launch, participants' feedback will be used to improve the course structure and materials and to prepare the second (and final) version, which will be available after the project finish.

Table 3 represents current status of the MOOC content development.

Table 3: Status of the MOOC content development

Module Nr.	Module name	Status of the content development
1	Inquiry Learning with Online Labs	Two of three video lectures are available. The third video will be available by the end of 2014.
2	Creating Inquiry Learning Spaces	Module scenario is available. Videos will be created after M24 using new version of the Portal.
3	Archimedes' Principle	Module scenario is in progress.
4	Exploring the Sun	Several video lectures are available. Demo-video will be created after M24.
5	Exploring galaxies	Module scenario is in progress. Video lectures will be available at the beginning of 2015.
6	Conservation of momentum	The first video lecture is available. Other videos will be available at the beginning of 2015.

Towards the end of the project, all course materials will be revised and updated, if necessary, to create the final version of the course. Go-Lab Portal and ILSs demos will be updated to represent the latest version of the software. This final version of the MOOC will be available after the project time and will be launched several times a year being maintained by IMC.

Created course materials (videos, text documents, sample ILS, etc.) can be used by the Go-Lab partners in any other activities, such as presence workshops and online courses provided at other platforms. Materials can be also distributed via online and offline dissemination channels as Open Educational Resources.

2.4 Offline Dissemination Activities

The offline dissemination activities of the Go-Lab Project include the organization of small scale focused activities like local workshops and presentations for teachers and large scale dissemination events like summer schools, project presence at international conferences, symposia and workshops, organising round tables and public discussions, publishing papers in conference proceedings, international journals and magazines, as well as international promotion of the project and its results (e.g., in countries outside the EU).

This section represents an overview of conducted dissemination activities and corresponding statistics, provides information on cooperation with related projects and associations, as well as on collaboration with Ministries of Education in the pilot countries, lists publications of the second project year, and describes newly developed dissemination materials. The list of all dissemination activities (including event name, country, number of participants, and a link, if available) is provided in the Annex A.

2.4.1 Dissemination activities by countries

In the second project year, Go-Lab was represented at multiple conferences and scientific events, as well as in scope large-scale teacher events and small workshops. A total amount of 5,731 stakeholders[27] (mostly teachers, but also scientists, online lab providers, and representatives of associations and projects) was reached. Moreover, about 15,000 stakeholders were addressed with 11 project booths and demonstrations at conferences and exhibitions.

The dissemination events were conducted in 22 countries, mostly in Europe, but also in Canada, China, Hong Kong, Indonesia, Morocco, Russia, and São Tomé and Prínci. 83% of events were conducted in pilot countries (Austria, Belgium, Estonia, Germany, Greece, Italy, Netherland, Portugal, Spain, Switzerland, and UK) covering 82% of participants. There were no large-scale dissemination activities in Bulgaria, Poland and Romania (however, teachers from these countries were addressed by the project contests: 4 winners of the Teacher Contest come from Bulgaria, Poland and Romania, and the winner of the Mini Video Contest comes from Romania). Cyprus concentrated on direct contact to schools and implementation activities, which are not reported in this deliverable. Project booths were organized in Austria, Belgium, Germany, Estonia, Lithuania, Spain, and UK.

Table 4 represents the dissemination activities (excluding project booths) in different countries providing number of events conducted in particular country and their percentage of a total number of 112 events, number of participants in the country and their percentage of a total of 5,731 participants, as well as an average number of participants per event per country. The average number of participants per event per country is calculated as follows: number of participants in all events in the country divided by number of events in the country. For example, in China there was one presentation for 300 participants; the average number of participants is 300. In Portugal there were 24 events, in which a total number of 1,123 participants took part; the average number of participants per event is, thus, 1,123/24 = 47 participants.

[27] An approximate number based on partners' estimations, as of 28th October 2014

Table 4: Number of dissemination events and participants per country

Country	Nr. of events	Nr. of participants	Av. Nr. partic-ipants/ event	Percent of all events	Percent of all participants
Austria	1	170	170	1%	3%
Belgium	7	596	85	7%	10%
Canada	4	295	74	4%	5%
China	1	300	300	1%	5%
Croatia	2	65	33	2%	1%
Estonia	7	315	45	7%	5%
Germany	4	99	25	4%	2%
Greece	21	1310	62	19%	23%
Hong Kong	1	30	30	1%	1%
Indonesia	1	30	30	1%	1%
Italy	1	40	40	1%	1%
Malta	1	20	20	1%	0%
Morocco	1	80	80	1%	1%
Netherlands	11	191	17	10%	3%
Online events	3	46	15	3%	1%
Portugal	24	1123	47	23%	20%
Russia	1	31	31	1%	1%
São Tomé and Prínci	1	20	20	1%	0%
Spain	6	230	38	6%	4%
Sweden	1	80	80	1%	1%
Switzerland	7	258	37	7%	5%
Turkey	1	12	12	1%	0%
United Kingdom	5	390	78	5%	7%
TOTAL	**106**	**5731**	**54**		

Figure 15 (on the next page) visualizes information represented above. Blue bulks stand for percentage of events conducted in particular country (of a total number of 112 events), red bulks – for percentage of participants in the country (of a total of 5,731 participants), and green line for an average number of participants per event per country.

As one can see form the chart, there are two “dissemination activity leaders”, which are Greece and Portugal (covering approximately 20% of events and participants each). There are also countries, in which only one event (e.g., conference presentation or a key note speech) took place; these are mostly non-pilot countries. The leaders in the number of participants per event are China (300), Austria (170), Belgium (85), Morocco (80), Sweden (80), UK (78), and Canada (74), as in this countries several presentations at large conferences and events for scientists and teachers were given. On the other hand, multiple small workshops and presentations took place in Spain (average number of participants 38), Germany (25), and Netherlands (17).

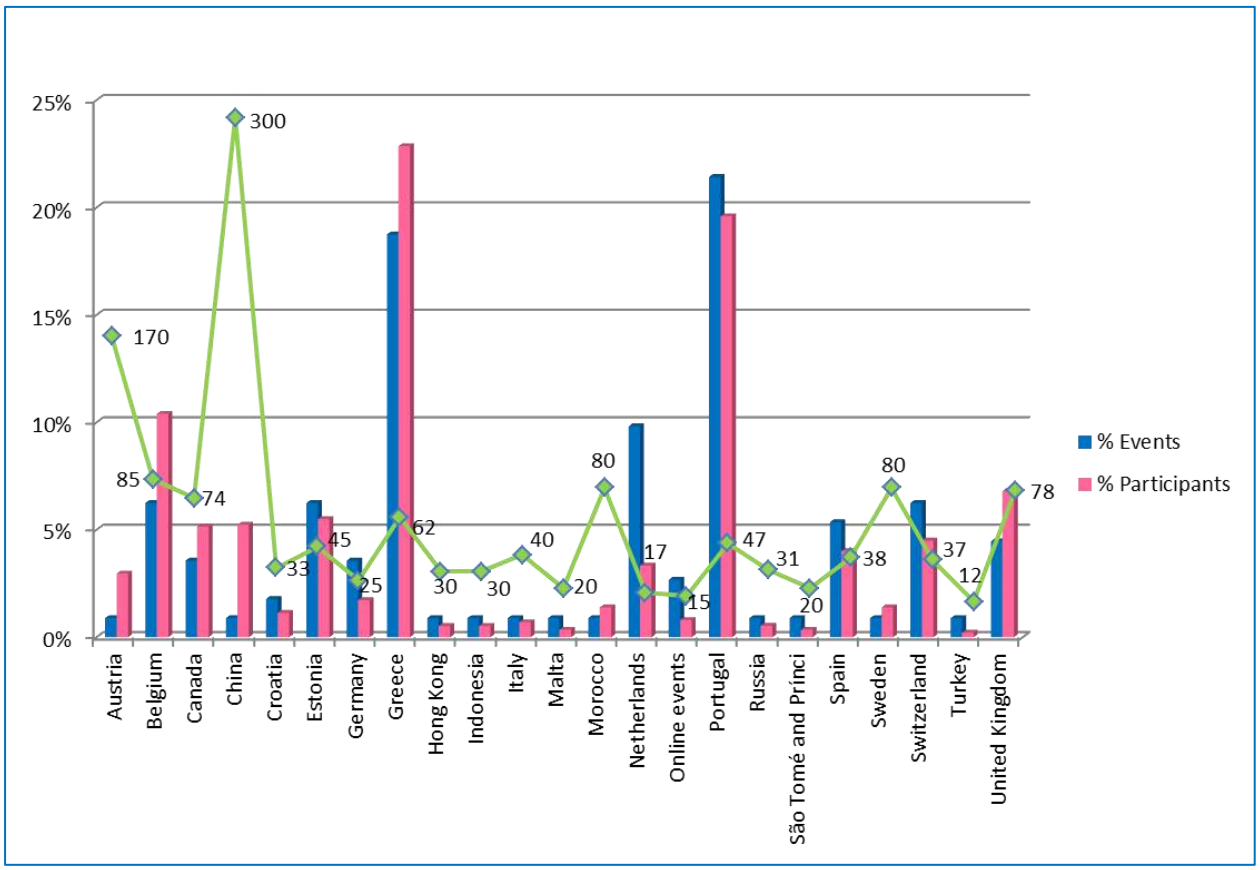

Figure 15: Number of dissemination events and participants per country

2.4.2 Presentations, workshops, and booths

In the Year 2, the Go-Lab partners gave 54 presentations (including key note speeches mentioning Go-Lab, invited talks, paper presentations, etc.) for 3,422 participants, conducted 37 workshops and hands-on sessions with 1,310 participants, carried on 3 online workshops with 46 participants, and organized 11 booths and public demos of the Portal targeting around 15,000 participants. (Dissemination events organized in cooperation with other projects and communities are described in the next section). An average number of participants per presentation was 63 persons, 35 persons per workshop, and 15 persons per online workshop.

Figure 16 represents the number of dissemination events and participants (in brackets).

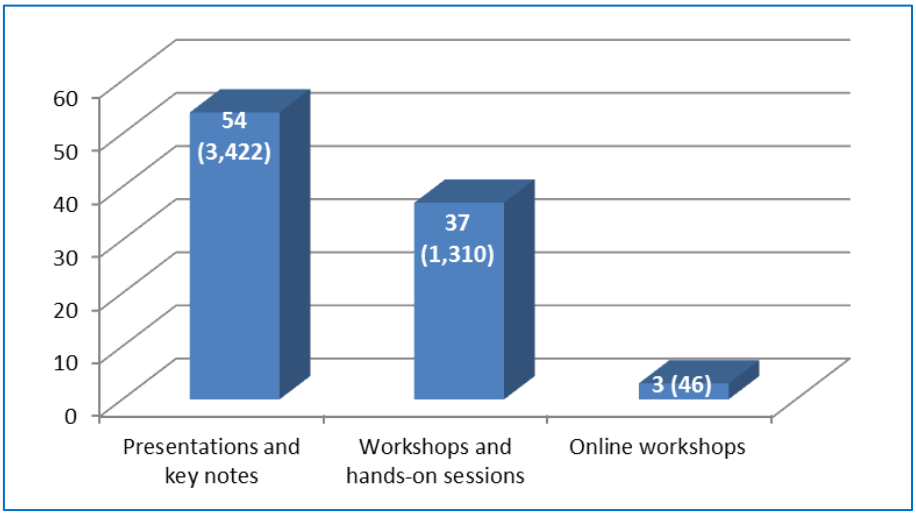

Figure 16: Number of dissemination events and participants

Presentations (54 events/ 3,422 participants):

The project was represented at the REV2014 conference, iSER2014, ACM CHI 2014, IADIS2014, ITHET2014, EDULEARN2014, iCEER2014, ICWL2014, EDUCON2014, SCIENTIX2014 and many other international and national conference. The ICALT2014 conference was organized by CERTH in cooperation with other consortium members. Go-Lab was represented with a special track on Technology-Enhanced Science, Technology, Engineering and Math Education, four presentations (ca. 50 participants each), and a project booth. Moreover, Go-Lab was represented at large scientific and teacher events like ECO-Schools meeting and Astronomy Education Alliance Meeting in Portugal, Science and the Assembly and ESERO Space Education meetings in UK, at several ATLAS outreach meeting in Switzerland, at STEM-Day in Germany, and many other events.

Workshops (37 events/ 1,310 participants):

Go-Lab organized a workshop on Remote Experiment in Inquiry-Based Instruction at EDUCON2014 conference in Turkey, a workshop on JTEL Summer School on Malta, demonstrated Go-Lab to the participants of Greek Teachers Programme at CERN, Switzerland, conducted a "Smart device & smart gateway" meeting for online lab providers in Spain, provided multiple hand-on sessions including Go-Lab activities for the participants of IPPOG master-classes in Greece and Switzerland, organized a five-day Go-Lab teacher training in Enschede, as well as multiple workshops and presentations for teachers in different countries.

Online workshops (3 events/ 46 participants):

Online workshops for teachers on the topic of "Inquiry Based STEM teaching with Online Labs" were organized by EUN (Belgium) from April to July 2014 explaining the advantages and challenges of using remote and virtual labs in the classroom and carrying out live demonstrations and experiments[28].

Project booths (11 events/ 15,000 potential participants):

The project booths were organized at the ICWL2014 conference in Estonia, at the SCIENTIX conference in Belgium, at the TAEE2014 conference in Spain, at VI Jornada Universitaria de Innovación y Calidad conference in Spain, at 48th EPCA annual meeting in Austria, at Euro-Space-Day in Germany, at Stargazing Live Event in UK, at National Astronomy Week in UK, at Royal Society Summer Exhibition in UK, and at the ICT 2013 Exhibition in Lithuania. Some booths, for example the booth at the SCIENTIX conference for teachers, provided not only general information about the project, but also a live demonstration of the Go-Lab Portal and online labs (e.g., Faulkes Telescope).

Go-Lab Summer School (39 participants):

The most important project event, the Go-Lab Summer School (http://golab2014.ea.gr) was conducted in Marathon, Greece from 13th to 18th July 2014. In scope of this event, teachers (winners of the Go-Lab Teacher Contest) could gain hands-on experience in using Go-Lab Portal and creating own lesson plans and ILSs using different online labs. The Summer School was disseminated through all online dissemination channels. As this event is considered as an implementation activity, it is not included in statistics above and is described in details in the Deliverable D6.4 Report on the participatory engagements activities (M24).

[28] Online Workshop announcement at EUN website: Link

2.4.3 Synergy actions with related organizations

Go-Lab conducted 16 teacher events in cooperation with Future Classroom project, Global Excursion project, ingenious project, Galileo Teacher Training Program, and Scientix community. Table 5 represents an overview of these events.

Table 5: Overview of teacher events in cooperation with other projects

Project	Description of event	Country	Number of participants
Future Classroom Lab	Go-Lab workshop Inquiry Based STEM teaching with Online Labs at the 4th Science Projects workshop	Belgium	24
Global Excursion	Go-Lab presentation during Global Excursion closing event	Belgium	32
Galileo Teacher Training Program	Go-Lab training at GTTP International teacher event	Portugal	20
Galileo Teacher Training Program	Session on IBSE & Go-Lab at the ESA/GTTP teacher workshop entitled “Inspiring science education”	Netherlands	20
Galileo Teacher Training Program	Go-Lab presentation at the ESA/GTTP training	Netherlands	29
Galileo Teacher Training Program	Two sessions at the ESA/GTTP teacher workshop entitled “The Go-Lab project”	Netherlands	40
Galileo Teacher Training Program	Session at the ESA/GTTP teacher workshop entitled “The Down2Earth impact simulator”	Netherlands	20
Galileo Teacher Training Program	Two sessions at the ESA/GTTP Summer Workshop for teachers entitled “Down2Earth - from deep space to deep impact”	Netherlands	40
inGenious Project	General information on Go-Lab + Brochures disseminated at 3rd inGenious Academy for Heads of Schools	Sweden	80
inGenious Project	Two Go-Lab workshops during the inGenious summer school	Croatia	65
Scientix Project	Go-Lab presentation during the 2nd Scientix Project's networking event	Belgium	33
Scientix Project	General information + Dissemination materials at the Scientix teachers meeting	Belgium	30
Scientix Project	Presentation of the Go-Lab project to science teachers at SCIENTIX conference 2014	Belgium	450

Furthermore, in cooperation with weSPOT project Go-Lab conducted a workshop entitled “Guided inquiry with online labs – a participatory design experience” in scope of the ICCE2013 conference on Bali. As the result of exchange between the projects, Go-Lab inquiry tools were integrated into the weSPOT platform, so teachers and students using the weSPOT inquiry space could gain access to the widgets developed by the Go-Lab project.

In addition, during the REV2014 conference in Turkey, a round table was organized by UDEUSTO (together with CUAS). Participants of the conference (from 12 countries) took part in the discussion on how to encourage school teachers to use remote labs in their curricular.

2.4.4 Dissemination among Ministries of Education

Go-Lab Pilot coordinators (EUN and EA) as well as National Coordinators organize activities reaching national Ministries of Education (MoEs) in each pilot country. Also, MoEs are reached by means of events organized or supported by Go-Lab (like EMINENT event organized by EUN, http://www.eun.org/about/eminent). MoEs are involved in the selection of Go-Lab pilot schools for each pilot phase (especially Flemish and Spanish MoEs have been active).

To name the first adoption at the ministry level, Go-Lab project has been approved by the Education Department of Basque Government as an innovative instrument for science school teachers. Each year Education Department promotes and recommends maximum four programs, projects or tools for innovative teaching and learning for school teachers. In frame of this activity teachers get training on the use of recommended instruments. Chosen instruments target to improve curricular in Basque Country schools in a way of innovation and creativity.

A second case is the Greek Ministry of Education that started introducing online labs in lower secondary schools with the aim to include inquiry-based learning activities in the curriculum and final assessment.

In the Netherlands, UT established cooperation with Kennisnet (http://www.kennisnet.nl), which is a public non-profit educational organization supporting primary, secondary and vocational institutions in the effective use of ICT and being financially supported by the Dutch Ministry of Education.

In Portugal, NUCLIO cooperates with the department responsible for pedagogical tools and resources called ERTE (Equipa de Recursos e Tecnologias Educativas). There is a cooperation agreement including certification of schools, teachers and students working with NUCLIO. Also, the teacher training course provided by NUCLIO is certified by the Ministry of Education.

Finally, an agreement is being prepared with the IT-service of Geneva Ministry of Education (Service Ecole Média (SEM) du Département de l'Instruction Publique (DIP), http://www.ge.ch/sem) to have Graasp promoted as an open platform for teachers from the State of Geneva, which will lead to the adoption of the Go-Lab Portal in this state.

2.4.5 Scientific publications

As a research project, Go-Lab seeks to have a significant impact on international research in the areas of technology enhanced and inquiry-based learning, as well as STEM and school learning in general. In the second project year, Go-Lab published 13 scientific papers in conference proceedings, one contribution to the IEEE STCSN e-letter, and two book chapters:

de Jong, T., Lazonder, A. W.: The guided discovery principle in multimedia learning. In: R. E. Mayer, J. J. G. van Merriënboer, W. Schnotz, & J. Elen (Eds.), The Cambridge handbook of multimedia learning (Second ed.), pp. 371-390. Cambridge: Cambridge University Press, 2014.

de Jong, T., Sotiriou, S., Gillet, D.: Innovations in STEM education: The Go-Lab federation of online labs. In: Proceedings of the International Conference on Smart Learning Environments (ICSLE 2014), Hong Kong, July 2014

Dikke, D., Tsourlidaki, E., Zervas, P., Cao, Y., Faltin, N., Sotiriou, S., Sampson, D.: GOLABZ: Towards a federation of online labs for inquiry-based science education at school. In: Proceedings of the 6th International Conference on Education and New Learning Technologies (EDULEARN2014), Barcelona, Spain, July 2014.

Hecking, T., Manske, S., Bollen L., Govaerts, S., Vozniuk, A., Hoppe, U.: A Flexible and Extendable Learning Analytics Infrastructure. In: Advances in Web-Based Learning - ICWL 2014, Proceedings of the 13th International Conference (ICWL 2014), Tallinn, Estonia, August 2014.

Heintz, M., Law, E., Govaerts, S., Holzer, A., Gillet, D.: Pdot: participatory design online tool. In: Proccedings of ACM CHI Conference on Human Factors in Computing Systems, Toronto, Canada, April-May 2014.

Heintz, M., Law, E., Heintz, S.: Review of Online Tools for Asynchronous Distribute Online Participatory Design. In: IEEE STCSN e-letter vol. 2, no. 3 on Large-Scale Social Requirements Engineering.

Li, N., Holzer, A., Govaerts, S., Gillet, D.: Enforcing Privacy for Teenagers in Online Inquiry Learning Spaces. In: Proccedings of ACM CHI Conference on Human Factors in Computing Systems, Toronto, Canada, April-May 2014.

Manske, S., Hecking T., Bollen L., Göhnert T., Ramos A., & Hoppe H. U. : A Flexible Framework for the Authoring of Reusable and Portable Learning Analytics Gadgets. In: Proceedings of the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014), Athens, Greece, IEEE Computer Society, July 2014.

Orduna, P., Caminero, A., Lequerica, I., Zutin, D., Bailey, P., Sancristobal, E., Rodriguez-Gil, L., Robles-Gomez, A., Latorre, M., DeLong, K., Tobarra, L., Ros, S., Castro, M., López-de-Ipiña, D., García-Zubia, J.: Generic integration of remote laboratories in public learning tools: organizational and technical challenges. In: Proceedings of the IEEE Frontiers in Education conference (FIE 2014), Madrid, Spain, October 2014

Rodriguez Artacho, M., Castro, M., Stella Robles, L., Martin, S., Ros, S.: Enhancing Higher Education Experience: The eMadrid initiative at UNED University. In: Proceedings of the IEEE Frontiers in Education conference (FIE 2014), Madrid, Spain, October 2014

Rodriguez-Gil, L., Latorre, M., Orduña, P., Robles-Gomez, A., Sancristobal, E., Govaerts, S., Gillet, D., Lequerica, I., Caminero, A., Hernández, R., Ros, S., Castro, M., López-de-Ipiña, D., García-Zubia, J.: OpenSocial Application Builder and Customizer for School Teachers. In: Proceedings of the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014), Athens, Greece, IEEE Computer Society, July 2014.

Vozniuk, A., Govaerts, S., Manske, S., Hecking, T., Bollen, L., Gillet, D.: AngeLA: Putting the teacher in control of privacy in the classroom. In: 3rd International Conference on Information Technology Based Higher Education and Training (ITHET), York, United Kingdom, September 2014.

Zervas, P., Fiskilis, S., Sampson, D.: ASK4LABS: A Web-based Repository for Supporting Learning Design Driven Remote and Virtual Labs Recommendations. In: Proceedings of the 11th International Conference on Cognition and Exloratory Learning in Digital Age (CELDA2014), IADIS Press, October 2014.

Zervas, P., Kalamatianos, A., Tsourlidaki, E., Sotiriou, S., Sampson, D.: A Methodology for Organizing Virtual and Remote Laboratories. In: D. Sampson, D. Ifenthaler, J. M. Spector and P. Isaias, (Eds.), Digital Systems for Open Access to Formal and Informal Learning, Springer, ISBN 978-3-319-02263-5, Chapter 15, pp. 235-255, September 2014.

Zervas, P., Kalimeris, I., Sampson, D.: A Method for Developing Mobile Virtual Laboratories. In: Proceedings of the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014), Athens, Greece, IEEE Computer Society, July 2014.

Zervas, P., Trichos, A., Sampson, D., Li, N.: A Responsive Design Approach for Supporting Mobile Access to Virtual and Remote Laboratories. In: Proceedings of the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014), Athens, Greece, IEEE Computer Society, July 2014.

The paper “A method for developing mobile virtual laboratories” by P. Zervas, I. Kalimeris and D. Sampson was awarded as the best short paper of the ICALT2014 conference (see Figure 17 on the next page).

A full and updated list of the Go-Lab publications, as well as papers for download, is available on the project website: http://www.go-lab-project.eu/publications.

Figure 17: Best short paper award of the ICALT2014 conference

2.4.6 Dissemination materials

At the beginning of the second project year, previously designed dissemination materials were printed and shipped to the project partners in order to support their organization of offline dissemination activities. Table 6 provides an overview of materials that were made available.

The dissemination materials were delivered in the quantities requested by the projects partners, thus, some of materials are still available in stock at IMC. Additional materials can be delivered (and printed, if needed) on demand of the project partners.

Table 6: Project dissemination materials

Dissemination material	Quantity (printed)/ sent to partner
Project leaflet (English)	5,000 (almost all partners)
Project leaflet (German)	1,000 (IMC, UDE, CUAS)
Project leaflet (Greek)	2,000 (EA, IASA, CERTH, UCY)
Project leaflet (Spanish)	1,000 (UNED, DEUSTO)
Project leaflet (Portuguese)	1,000 (NUCLIO)
Project leaflet (Estonian)	1,000 (UTE)
Project leaflet (French)	1,000 (EPFL, CERN)
Project leaflet (Dutch)	1,000 (UT)
Project Business Card	3,000 (almost all partners)
Project Roll-Up	4 (2x IMC, 1x NUCLIO, 1x DEUSTO).
Pens with Website-URL print	2,000 (almost all partners)
3D-puzzles with Golabz-URL print	300 (distributed on demand)

2.5 Key Performance Indicators

This section describes Key Performance Indicators (KPIs), which are used to measure the efficiency of the project dissemination activities in order to keep overview of the current status and to define (corrective) activities for the future periods. The evaluation is conducted to the end of each project year starting with the Year 1.

2.5.1 Online Dissemination

The following KPIs were defined in the Deliverable D9.2 and describe the project's presence in the web and the usage degree of the project social media. Table 7 represents the descriptions of the KPIs (including instructions for calculation) and the methodology for estimation of target values for the Years 2, 3, and 4 (estimation of target values was made in Deliverable D9.2 based on the achieved values of the Year 1). This table represents information from the Deliverable D9.2 and is provided for convenience. Actual KPI values are represented in the Table 8.

Table 7: Calculation of Online Dissemination KPIs and estimation of target values

Description and calculation of KPIs	**Estimation of target values** **(based on achieved values of the Year 1, see Table 8 for Year 1 values and target values)**
K1.1: Project website unique visitors	
The reach of the project website is measured based on the unique visitor number. The DoW defines minimum numbers of 100, 3,000, 5,000, and 7,500 unique visitors for each project year respectively. The KPI is measured with Google Analytics.	According to DoW.
K1.2: Links to the Go-Lab website	
This KPI provides the number of online resources, in which the link to the Go-Lab project website is placed. The KPI is measured using alexa.com.	Achieved value Year 1 = 32; 32 – 19 (consortium partners' websites) – 3 (project social media) = 10 links in 6 months. Thus, realistic estimation for a year is 20 links. Estimation for each following year includes 5% increase compared to previous year (own target setting).
K1.3: Project audience	
This KPI provides the number of recipients of project announcements and includes number of newsletter registrations on the project website, number of social media group members on Facebook, Google+, and LinkedIn, and followers on Twitter, YouTube, SlideShare, and Flickr (all numbers excluding project partners).	Achieved value Year 1 = 121; Estimation for each following year includes 5% increase compared to previous year (own target setting); 10% drop off rate is considered. Thus, planned value for each following year can be calculated as follows: K1.3(N) = K1.3(N-1)*1,05; K1.3(N, cumulative) = K1.3(N) + K1.3(N-1, cumulative)*0,9.

Description and calculation of KPIs	Estimation of target values **(based on achieved values of the Year 1, see Table 8 for Year 1 values and target values)**
K1.4: Project Engagement	
This criterion describes the own use of the social media providing the number of resources uploaded and shared on the content sharing platforms, as well as the number of discussions started by the project in groups. The KPI includes number of discussions started by the project in Facebook, Google+, and LinkedIn groups, number of posts on the Facebook page, number of tweets and retweets made by the project on Twitter, number of videos uploaded on YouTube, number of presentations uploaded to SlideShare, and number of albums uploaded to Flickr.	Achieved value Year 1 = 236; this value has been reached in 6 months. Thus, realistic estimated value for a year is 236*2 = 472. Estimation for each following year includes 2% increase compared to previous year (own target setting).
K1.5: Audience Engagement	
This KPI describes users' activity and provides the number of discussions, comments, likes, and shares for the project website and each social media channel. The KPI includes number of discussions started by external stakeholders in Facebook, Google+, and LinkedIn groups, number of likes of the Facebook page, number of "retweet" and "favorite" actions on Twitter, number of shares of the website content (via e-mail and social media), and number of likes, comments, shares, and downloads of the content posted on YouTube, SlideShare, and Flickr.	Achieved value Year 1 = 243 actions; this value has been reached with audience = 121 (see K1.3). Thus, average activity per member is 243/121 = 2 (actions per member). This value is valid for new community members, whereas those members being in an online community for some time are usually not as active. Thus, a minimum value of the audience engagement for each following year is K1.5(N) = K1.3(N)*2.

Table 8 (on the next page) provides target values for each project year (beginning with the Year 2, estimated as explained in the table above) and achieved values for the Year 1 and Year 2. For each KPI, the first row provides target value (also marked with cursive), and the second row – the actually reached value. Under the table, comments to the calculation and achieved values in the Year 2 are given.

Table 8: Online Dissemination KPIs

Nr.	KPI	Target source	Year 1	Year 2	Year 3	Year 4
K1.1	Project website unique visitors	*DoW*	*100 per year*	*3,000 per year*	*5,000 per year*	*7,500 per year*
			1,460	**20,358**	-	-
K1.2	Links to the Go-Lab website	*Own target setting; +5% to previous year*	-	*21 per year*	*22 per year*	*23 per year*
			32	**20**	-	-
K1.3	Project audience	*Own target setting; +5% to p.y., -10% drop off*	-	*127 per year (236 cum.)*	*133 per year (345 cum.)*	*140 per year (450 cum.)*
			121	**753 (874 cum.)**	-	-
K1.4	Project Engagement	*Own target setting; +2% to previous year*	-	*481 per year*	*491 per year*	*501 per year*
			236	**1,431**	-	-
K1.5	Audience Engagement	*Own target setting; av. 2 actions/ new member*	-	*254 per year*	*266 per year*	*280 per year*
			243	**563**	-	-

Comments:

In terms of website link dissemination and social media dissemination Go-Lab met the set goals. In order to improve K1.2, in the third project year, more cross-links between the project website and websites of cooperation partners (e.g., other projects) should be placed. The website should be also listed in repositories for STEM resources.

The KPIs are calculated as follows:

K1.1: using Google Analytics

K1.2: using alexa.com

K1.3: 303 Facebook group members + 258 Twitter followers + 43 LinkedIn group members + 28 Google+ group members + 34 YouTube followers + 6 SlideShare followers + 7 Flickr followers + 150 newsletter recipients – 76 project members in all channels = 753

K1.4: 28 Facebook page posts + 184 Facebook group posts + 1,086 Tweets and Retweets + 21 LinkedIn posts + 92 Google+ posts + 10 own YouTube videos + 1 SlideShare presentation + 9 Flickr albums = 1,431

K1.5: 174 Facebook page likes + 17 discussions on Facebook started by audience + 5 direct contacts on Facebook + 6 discussions on LinkedIn started by audience + 97 mentions and retweets on Twitter + 11 likes of YouTube videos + 20 likes, downloads and embedding actions of SlideShare presentations + 233 sharing actions on the website = 563

Downloading actions on the website are not calculated in K1.5, as it was not initially foreseen in the definition of this KPI. The number of downloads from the website in the Year 2 is 1,977.

2.5.2 Offline Dissemination

The following KPIs were defined in the Deliverable D9.2 and describe offline dissemination activities of the project. Table 9 represents the descriptions of the KPIs and the methodology for estimation of target values for the Years 2, 3, and 4 (estimation of target values was made based on the achieved values of the Year 1). This table represents information from the Deliverable D9.2 and is provided for convenience. Actual KPI values are represented in the Table 10.

Table 9: Description of Offline Dissemination KPIs and estimation of target values

Description and calculation of KPIs	**Estimation of target values** **(based on achieved values of the Year 1, see Table 10 for Year 1 values and target values)**
K2.1: Project Events	
This KPI provides the number of events conducted by the Go-Lab project (e.g., presentations, workshops, round tables, etc.) and the number of involved participants. This KPI does not include events organized by WP3 (Participatory Design Workshops), WP6 (Visionary Workshops and Practice Reflection Workshops), and WP7 (Summer Schools).	Own target setting: at least the same results as in the first project year have to be reached (any growth can hardly be planned, as the project has already reached very high numbers).
K2.2: Cooperation Events	
This KPI provides the number of events organized in cooperation with other projects and initiatives (such as Go-Lab presentations at teacher trainings conducted by other projects) and number of participants, who have been involved in these events. This KPI does not consider Go-Lab workshops and other events devoted exclusively to Go-Lab, as they refer to the K2.1.	Own target setting: at least the same results as in the first project year have to be reached (any growth can hardly be planned, as the project has already reached very high numbers).
K2.3: Publication Number	
This KPI provides the number of publications, including publications in conference proceedings, (online) journals and magazines, books, as well as dissertations and thesis on Go-Lab. The DoW defines the goal of 10, 25, 35, and 45 publications in each project year respectively.	According to DoW.

Table 10 provides target values for each project year (beginning with the Year 2) and achieved values for the Year 1 and Year 2. For each KPI, the first row provides target value (also marked with cursive), and the second row – the actually reached value. Under the table, comments to the calculation and achieved values in the Year 2, as well as corrected estimations for the following years, are given.

Table 10: Offline Dissemination KPIs

Nr.	KPI	Target source	Year 1	Year 2	Year 3	Year 4
K2.1	Project Events	*Own target setting*	*Events/ Participants*	*51/ 2,900*	*~~51/ 2,900~~ 94/4,778*	*~~51/ 2,900~~ 94/4,778*
			51/ 2,900	**94/4,778**	-	-
K2.2	Cooperation Events	*Own target setting*	*Events/ Participants*	*61/ 3,322*	*~~61/ 3,322~~ 18/953*	*~~61/ 3,322~~ 18/953*
			61/ 3,322	**18/953**	-	-
K2.3	Publication Number	*DoW*	*10 per year*	*25 per year*	*35 per year*	*45 per year*
			10	**16**	-	-

Comments:

K2.1: the target values are reached. The target values for the years 3 and 4 have been corrected based on the results of the Year 2. (See comments to K2.2 explaining decreased number of cooperation events and increased number of project events).

K2.2: the estimation for the Years 2, 3 and 4 was made based on the Year 1 results. In the first project year, Go-Lab conducted about 50 presentations and workshops reaching more than 3,000 participants in cooperation with Discover the Cosmos project (as Go-Lab and Discover the Cosmos have the same audience, cooperative organization of events was possible). As Discover the Cosmos project has finished in August 2013, this possibility could not be used anymore. In the Year 2, Go-Lab cooperated mostly with Scientix and inGenious project as well as with Galileo Teacher Training Program, and could organize 18 events and reach a number of 953 participants. Many events were organized in scope of partners' activities (for example, Go-Lab presentations in scope of partners' workshops) and, thus, reported as project events (K2.1). The target values for the years 3 and 4 have been corrected based on the results of the Year 2.

K2.3: Go-Lab defined target values of 10, 25, 35, and 45 publications per year for project years 1, 2, 3, and 4 respectively. In the second project year, it became obvious that most of the partners concentrate on implementation activities at schools and, thus, do not publish many scientific papers (most of publications come from the technical cluster). In the Year 2, Go-Lab published 16 publications (2 more journal publications are in the review process). Setting priority on implementation activities, we do not aim to significantly increase the number of publications in following years. The results from technical and pedagogical clusters will be published aiming to reach at least the same number of publications as in the Year 2.

3 Sustainability and Exploitation Plan

The Go-Lab project aims at introducing inquiry learning methods and tools in school education, giving access to online labs via an integrated web portal, providing supportive scaffolds and applications, creating new learning scenarios and implementation recommendations, as well as assisting teachers in extending their practices by offering online and offline training activities and educational resources. To achieve this and to make the results sustainable, it is crucial to start technology transfer, standardization, and exploitation preparation activities during the project time. This section provides a Sustainability and Exploitation Plan (SEP) describing general exploitation strategy referring to the consortium as a whole and to all foreseen project results, as well as Individual Exploitation Plans (IEPs) of the partners specifying activities to be taken by each consortium member for particular results. Exploitation preparation activities that have already started are also mentioned in this section.

These exploitation plans (SEP and IEPs) will be verified concerning their feasibility for the project members and acceptability for the target groups during the third and fourth project years (e.g., by means of surveys and case studies with small target groups) and, thus, are subjects to change. All changes, as well as the final plan, will be documented in the Deliverables D9.4 (Year 3) and D9.5 (Year 4).

3.1 Project sustainability and exploitation plan

This section provides general SEP including description of planned exploitable results, description of addressed target groups, their interests and benefits, as well as a strategy for technology transfer as well as for achievement of sustainability and exploitation of the software and educational content created in scope of the project.

3.1.1 Planned exploitable results

Exploitable results of the Go-Lab project created in collaborative work in the work packages include the Go-Lab Portal, Inquiry Learning Applications, and Teacher Supporting Materials.

The Go-Lab Portal provides access to remote and virtual laboratories (plug technology/ lab-owner services), a single entry point to relevant repositories and communities (share technology & smart gateways/ cloud services), offers scaffolding and learning analytics services allowing learning support mechanisms in the forms of individual scaffolds, group recommendations, as well as supervision support for teachers. Booking services for online lab usage time and tutorial support, as well as features allowing exchange of services between users via a virtual currency will be available (Bartering (Tutoring) Platform/ add-on services).

The Go-Lab Portal provides Inquiry Learning Spaces allowing conduction of learning activities with online labs and supportive components. They can be adopted according to the subject domains, class level, scaffolding requirements, histories, dynamic contexts and inquiry learning process stages, as well as spoken languages (localization). Further, simple Inquiry Learning Apps able to interoperate with the core Go-Lab services will be the main mean for providing the necessary support. An App Composer will allow teachers to find, configure and create (if missing) resources compatible with their scenarios and aggregate them with a few clicks (thus, forming Inquiry Learning Spaces containing a lab, usage and scenario instructions, support tools, etc.). This Inquiry Learning Apps and Spaces are stored in the Online Lab Repository allowing easy search for online labs and additional resources.

Apart from the software solutions, the Go-Lab project creates inquiry classroom scenarios describing possible ways of including Go-Lab experimentation spaces in wider classroom settings, e.g., structuring the lesson around an online lab, establishing offline and online collaboration

between students, considering future career paths in course planning. Moreover, Go-Lab will create user guidelines for the teachers including indicative inquiry learning scenarios, easy guides for the use of the Go-Lab Portal, main characteristics of the Online Lab Repository, etc. Furthermore, a guideline summarizing experience gained in the project on how to effectively introduce remote and virtual labs in schools will be created.

Go-Lab workshops and training activities will be conducted also after the project time supporting school teachers in getting to know Go-Lab and implementing its methodology and software in their everyday teaching practice. Finally, Go-Lab develops a MOOC targeting school teachers who are not able to participate in Go-Lab workshops or want to extend their knowledge trying out additional scenarios and learning tools.

To summarize the above, planned exploitable results include:

I. Go-Lab Portal (incl. Services)
    1. Online Lab Repository
    2. Bartering (Tutoring) Platform
    3. App Composer
II. Online Labs, Apps and Spaces
    1. Online Labs (remote, virtual, data sets)
    2. Inquiry Learning Applications
    3. Inquiry Learning Spaces
III. Teacher support and training
    1. Classroom scenarios handbook
    2. Guidelines and supporting materials for teachers
    3. Recommendations for the introduction of online labs in schools
    4. Go-Lab training and support activities
    5. Go-Lab MOOC for school teachers

These results will be exploited by the consortium as a whole solution, which will be kept sustainable after the project time. Also, its parts (e.g., particular technologies, services, and pieces of software) will be exploited by the project partners, for example used as base technology in succession scientific projects or in commercial products.

3.1.2 Target groups characterization

The Go-Lab project targets several groups of stakeholders aiming at motivating them to become active participants of the Go-Lab community contributing to the development of the project (e.g., feedback given by teachers, access to online labs provided by external lab owners, etc.) and to adopt and use Go-Lab methodology and technology during and after the project time. Go-Lab target groups and their interests are briefly described below.

3.1.2.1 Individual stakeholders

The most important target group of the project is *school teachers* interested in extending their current teaching methods with inquiry learning activities. In order to assist teachers in using Go-Lab methods and technical infrastructure, the project offers Visionary Workshops informing them about the Go-Lab approach and collecting open feedback about it, Practice Reflection Workshops aiming at creating practice-oriented scenarios that can be implemented at schools, as well as Evaluation Workshops gathering best practices and experience reports after the implementation. Further, Teacher Support Program and Teacher Professional Development Program provide support to the teachers and guide them during the implementation of inquiry learning in the classroom. Further, Go-Lab provides teacher supporting materials including guidelines, recommendations, and online educational resources.

Another target group is *scientific researchers* and *instructional designers* who may want to use the Go-Lab approach and technical infrastructure to extend (online) learning programs they create with practical experimentations and simulations. Methodological outcomes of the Go-Lab project may also be used by the researchers in parallel and follow-up projects. Although there are no specific trainings offered by the project for these stakeholders, they may get support in using the Go-Lab Portal, as well as use support materials, scientific publications, and deliverables published by the project.

Students, in their turn, use the Go-Lab infrastructure in their learning activities in and out of class. The main idea of the Go-Lab project is to provide students with the possibility to use online labs while also being guided by the teacher, for example, in scope of a practice session. However, the Go-Lab Portal can be interesting also for those students wanting to deepen their knowledge in particular science areas additionally to the school program.

Lifelong learners can become an important target group after the project time contributing to the project sustainability and exploitation. Lifelong learners or hobby learners can be invited to study Go-Lab supporting materials and use Go-Lab infrastructure for private educational goals paying a small charge, which will be used to host and maintain the Portal after the project has finished. These users can be adults wanting to extend their knowledge in particular areas of science, university students wanting to gain more practical experience, as well as parents who want their children to experience science beyond school program.

3.1.2.2 Organizational stakeholders

Owners of online laboratories outside the project consortium (*online lab owners*), such as universities, research organizations, and commercial companies, can be involved in the project providing access to their online labs via the Go-Lab Portal. Main interest of this target group in cooperation with the project (if providing access free of charge) is to increase the awareness about their institutions and scientific activities among teachers and students (as a link to the general public), as well as in the scientific community. Further, the access to the online labs could be provided at a charge (in case of commercial lab providers), thus, contributing to the sustainability of both the Go-Lab project and the external online labs.

Educational providers (besides schools, e.g., universities and training organizations) might be interested in including inquiry learning activities in their educational programs. In the first place, usage of online labs can extend eLearning and blended learning programs, as well as Massive Open Online Courses (MOOCs). Thus, educational providers can use the Go-Lab Portal to get access to the online labs, as well as to obtain apps and templates to be integrated in their own learning environments.

If an organization provides both educational programs and online laboratories (which is the case, for example, for universities), we are talking about a *combined provider*. Such institutions might be interested in mutual exchange of online lab usage time, as well as in the exchange of supporting tutoring services, using the Go-Lab Bartering (Tutoring) Platform. This exchange can be conducted as bartering, but also on a financial basis.

Web portal providers offering web-based repositories for inquiry learning applications and online labs can be interested in integrating some of the Go-Lab labs and tools into their infrastructure, which would make Go-Lab software even more wide spread and sustainable. These repositories can also provide links to Go-Lab Bartering (Tutoring) Platform, Go-Lab MOOC, and teacher supporting materials offering assistance to the users and by this connecting them to the Go-Lab community. Web portal providers may be charged for the use of Go-Lab labs and tools, which will support financing the Go-Lab Portal after the project time.

Scientific museums and educational centers owning virtual collections and scientific portals (for example, Ecsite – The European Network of Science Centers and Museums,

http://www.ecsite.eu) and aiming at promoting science by providing hands-on experience to their visitors can be interested in using Go-Lab infrastructure for free or at a small charge. They will be able to extend their virtual environments with online experiments and provide access to scientific data sets and analysis tools of Go-Lab. Other examples of Go-Lab related activities they may choose to provide are organization of CERN virtual visits and Faulkes Telescope remote sessions for school classes guided by a teacher.

3.1.2.3 Other stakeholders

European and worldwide associations active in the fields of STEM and inquiry learning (e.g., GOLC, IEEE, inGenious, and Scientix) as well as professional development and teacher training initiatives (e.g., Comenius/Grundtvig Programme) are addressed in order to use synergies arising from the organization of joint events and trainings, as well as from the use of mutual dissemination infrastructure. These organizations can be used as multipliers promoting the Go-Lab Portal and online labs, and facilitating Go-Lab implementation in European schools.

Political stakeholders (e.g., Educational Ministries of involved countries) are targeted by the project as they can provide support for the schools at institutional level, for example, as regional support programs to integrate inquiry learning in regular classroom activities. This may include both organizational and financial support, e.g., to finance online lab usage in case of commercial labs. Furthermore, grants for teachers wanting to participate in the Go-Lab workshops can be arranged.

Private companies interested in implementation and use of information technology in schools are addressed to support Go-Lab schools after the project time as sponsors financing, for example, access to commercial online labs and additional paid services, like expert tutoring services on the Bartering (Tutoring) Platform.

General public is addressed by the project to increase the awareness about the inquiry-based learning and its implementation at schools, as well as about the project itself.

3.1.3 Technology transfer and sustainability

To achieve sustainability of the project results and technology transfer Go-Lab project conducts the following activities:

Pilot activities and building of a teacher community. In scope of the WP6 and WP7 Go-Lab establishes contact to school teachers all over Europe supporting them in adopting the technology and incorporating its use in everyday teaching practice. To achieve this, Go-Lab provides teacher workshops and trainings, as well as supporting materials (like guidelines, handbooks and upcoming Go-Lab MOOC). By collecting teachers' feedback Go-Lab assures correspondence of its offer to the needs of the teachers and high acceptance of the developed technology. Finally, Go-Lab provides personal support to the teachers, first of all, via National Coordinators, but also in the online community currently existing in the social media channels (in the future, Go-Lab community will be supported on the Bartering (Tutoring) Platform).

Currently, Go-Lab teacher community counts more than 500 pilot teachers. Up to now, 25 visionary workshops involving 490 participants, 25 practice reflection workshops involving 411 participants, 30 participatory design workshops involving 353 teachers, and 3 Summer Schools for a total number of 87 participants have been conducted, which is reported in the Deliverables D3.1 (M12), D3.2 (M24), and D6.4 (M24).

Including teachers' ILSs into the Go-Lab Portal. ILSs created by the teachers in scope of the Go-Lab implementation activities and while using Go-Lab in the teaching practice will be included in the Go-Lab Repository to be available for the colleagues as reference and support. These ILSs will be rated by the users of the Portal (also teachers) in order to provide quality assurance

and recommendation. Integration of teachers' ILSs will make the Go-Lab Portal a living infrastructure populated with user-generated content during and after the project time. Appropriate functionalities of the Portal are being developed.

Integration of external (non-Go-Lab) online labs into the Go-Lab Portal. Go-Lab seeks contact to online lab providers interested in the integration of their labs into the Portal. Some examples of already existing cooperation are: PhET interactive simulations (http://phet.colorado.edu, integration of HTML5-based simulations), EUMETSAT (http://www.eumetsat.int, integration of Earth observation data sets), Virtual Biology Lab Project (http://virtualbiologylab.org, integration of multiple labs), Inquiry-to-Insight Project (http://i2i.stanford.edu, online lab integration), and Luminescent Labs team (www.luminescentlabs.org, online lab integration). One more interesting initiative is the integration of some online labs of Virtual Labs project (http://www.vlab.co.in) providing access to virtual labs for Indian schools.

Providing access to Go-Lab resources via external web portals. Go-Lab aims at providing access to its infrastructure and particular labs and tools via external web portals concentrating on STEM-resources for teachers. This can be done by adding a link to the Go-Lab Portal to online catalogues of STEM resources or by integrating Go-Lab online labs and learning apps into external platforms. Currently, Go-Lab is listed on the STEMfinity website (http://www.stemfinity.com/Free-STEM-Education-Resources, USA). Discussion on cooperation with STEM Academy (http://stem-academie.be, Belgium) is in progress. Go-Lab expects to develop more cooperation during the third and fourth project years, as the technical infrastructure achieves its advanced level.

Cooperation with related research projects and applying for new projects. Currently, Go-Lab cooperates with GLORIA Project (http://gloria-project.eu) with the aim of promotion and deployment of inquiry learning with robotic telescopes and with weSPOT Project (http://wespot.net) organizing joint events and exchanging best practices and tools. Particularly, teachers and students using the weSPOT inquiry space have access to the widgets developed by Go-Lab, for example, the concept mapper, hypothesis builder, and data viewer. Go-Lab also seeks to transfer its technology into upcoming research projects. Currently, IMC works on a project proposal together with German-Turkish Advanced ICT Research Center (GT-ARC, http://www.gt-arc.com). In scope of this project a learning environment to be used by Turkish schools will be developed, in which also some of Go-Lab online labs and tools will be integrated. And vice versa, relevant virtual labs developed in the new project can be integrated into the Go-Lab Portal.

Cooperation with Ministries of Education. Go-Lab addresses national Ministries of Education (MoEs) in the pilot countries in order to assure their support for Go-Lab implementation and integration of inquiry-based educational activities in the school curriculum. Currently, MoEs in Greece and Basque Country introduce the use of online labs in schools. The progress of collaboration with MoEs in different countries is described in detail in Section 2.4.4 .

3.1.4 Software, services and content exploitation

In the Section 3.1.1 an overview of planned exploitable results is represented. This section specifies which results are relevant for which target groups and how these results can be sustained for use after the project time.

In order to make project results sustainable, it is important to generate sources of income, which will allow maintaining technical infrastructure and providing quality assurance and necessary updates. To do so, in addition to stakeholder groups specified by the aims of the project (school teachers, students, and political stakeholders), Go-Lab will attract stakeholders contributing to the exploitation of the project results, such as online lab providers (also for commercial labs), web portal providers (able to integrate some of the Go-Lab resources), private companies

(which can become sponsors for schools), museums and scientific centers (wanting to extend their virtual exhibitions), educational providers and instructional designers (who might be interested in some of paid services), as well as lifelong learners and students' parents (who might be interested in using Go-Lab at a small charge).

Figure 18 provides a simplified model of the exploitation preparation representing planned exploitable results, exploitation preparation phases and actions, addressed target groups, as well as their interconnections. Green and red circles mark free and paid services. Pink lines represent logic correlations (e.g., communication flow, contributions, etc.). Red and green lines describe if services are free or paid for particular target groups.

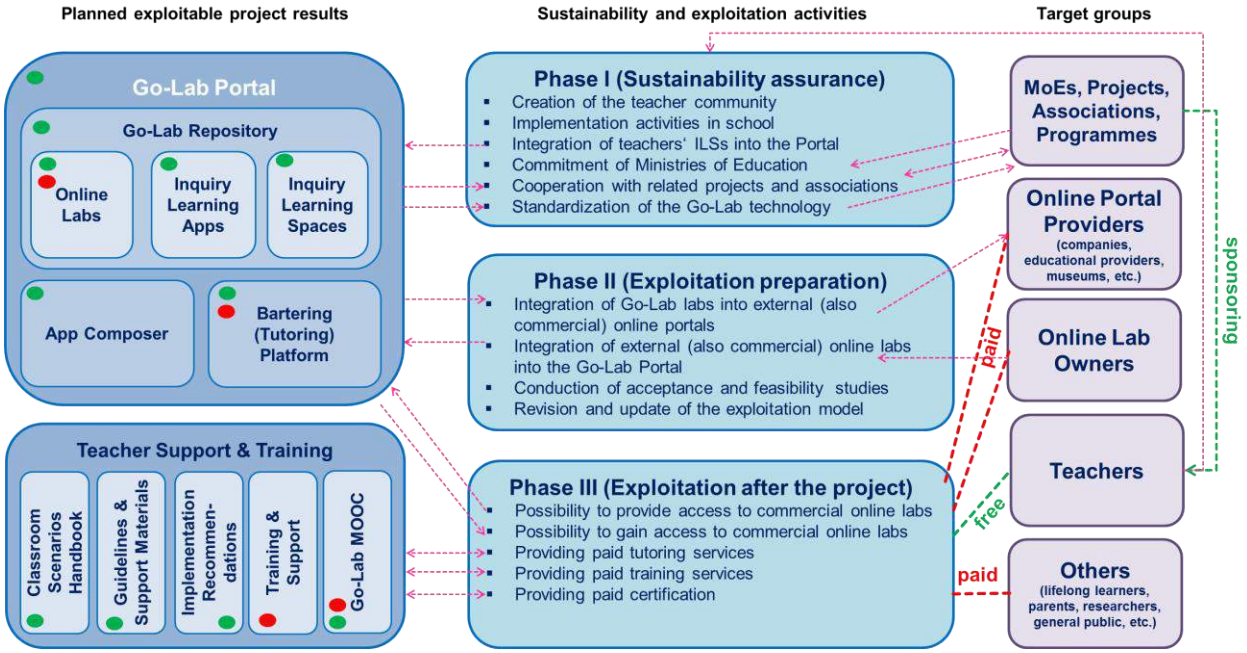

Figure 18: Exploitation preparation model

Go-Lab will test (during the project time) and offer (after the project time) paid services (optional for the users) complementing main project results, which will remain free also after the project has finished. Such additional services are, for example:

- Use of expert tutoring services on the Bartering (Tutoring) Platform (peer-to-peer exchange of tutoring time based on virtual currency will remain free). Main target groups for this service are teachers (who can be sponsored by Ministries of Education or private companies, for example, paying for a defined amount of tutoring hours per school), lifelong learners (paying for themselves), educational providers (e.g., organizational account for multiple users), and researchers and instructional designers (probably sponsored by their employers).
- Offering expert tutoring services on the Bartering (Tutoring) Platform. Several tutors will be employed and paid by consortium members. Additionally, it will be possible for other experts (e.g., employees of online lab owners, educational providers, and combined providers, scientific researchers and instructional designers) to provide their services via the Bartering (Tutoring) Platform paying a 30%-fee (30% of the revenue) to the Go-Lab Portal operator.
- Providing access to commercial online labs via the Go-Lab Portal. Besides Go-Lab online labs, which will remain free after the project time, and non-commercial labs, it will be possible to provide access to commercial online labs. In this case online lab owners will pay a 30%-fee (30% of the revenue) to the Go-Lab Portal operator.

- Gaining access to commercial labs. Access to commercial online labs can be sponsored for teachers and students by Ministries of Education or private companies. All other users (educational providers, lifelong learners, etc.) will pay for themselves.
- Providing access to Go-Lab Labs in another web portal. Web portal providers will be able to integrate some of the Go-Lab tools into their infrastructures. Free online labs will be offered for free (the integration in other portals will help to promote Go-Lab). For integrating commercial labs the web portal provider will have to pay a commission to the consortium (particular conditions will be discussed with the online lab owner and the web portal provider).
- Participation in Go-Lab training and support activities. After the project time, Go-Lab partners (like EA and NUCLIO) will keep conducting trainings and workshops for teachers all over Europe to support Go-Lab implementation. Participation will be sponsored by teacher professional development programs like Erasmus+, Comenius and Grundtvig, with which Go-Lab has already made very good experiences.
- MOOC participant certification. Whereas participation in the Go-Lab MOOC will be free for all stakeholders (incl. use of the platform, access to online labs, use of educational resources), it will be possible to receive a certificate of participation at a charge.

Table 11 summarizes which paid services will finance maintenance of which project results.

Table 11: Maintenance of the project results

Paid additional service	Free project result to be maintained	Responsible partner
Use of expert tutoring services on the Bartering (Tutoring) Platform (Go-Lab experts)	Go-Lab Portal (Bartering/Tutoring Platform)	IMC
Offering expert tutoring services on the Bartering (Tutoring) Platform (external experts)		
Providing access to commercial online labs via Go-Lab Portal (fee paid to Go-Lab)	Go-Lab Portal (Graasp, online labs, inquiry learning apps, ILSs, app composer, Online Lab Repository)	EPFL, IMC
Gaining access to commercial online labs via Go-Lab Portal (paid to online lab owner)		
Providing access to commercial online labs in external web portals (commission)		
Participation in Go-Lab training and support activities (sponsored for teachers)	Organization of Go-Lab training activities	EA, NUCLIO, EUN, IASA, CERN
MOOC participant certification	Go-Lab MOOC	IMC

Also an option of keeping Go-Lab Portal free for teachers and students and making it paid for all other users (lifelong learners, general public, etc.) can be considered and will be discussed among project partners.

Other project results (Classroom scenarios handbook, Guidelines and supporting materials for teachers, and Recommendations for the introduction of online labs in schools) will be offered for free as Open Educational Resources (OER) and do not require maintenance or update.

In order to verify represented exploitation model, acceptance studies and surveys on the use of paid services (expert tutoring services, use of commercial labs, certification) will be conducted among the groups of users (teachers, lifelong learners) and the groups of providers (online lab owners, educational providers, combined providers) during the project time. Further, a pilot with a small group of lifelong learners and other interested parties on the use of Go-Lab infrastructure will be conducted. Finally, the results of studies and the pilot will be analyzed and summarized in a project internal feasibility report. The exploitation model will be revised and adopted according to the findings of the studies, if needed.

Table 12 (see below) summarizes the above, representing an overview of planned exploitable results and additional services. It features the relevance of each result for particular target group (XXX - most relevant, XX – relevant, X – less relevant, “ “ – not relevant). Stakeholders of the category “others” (see Section 3.1.2) - Associations, Policy makers, Private companies, and General public - are not represented in the table, as they are not the end users of the Go-Lab results. The table mentions if the results will be provided for free or at a charge and if they can be sponsored for the end users by educational ministries or private companies (“sponsored”).

Table 12: Overview of planned exploitable results and services and their relevance for stakeholders

Result Nr.	Planned exploitable result/ Additional Service	School teachers	Researchers/ Instructional Design.	Students	Lifelong Learners	Online Lab providers	Educational providers	Combined providers	Museums/ Science Centers	Web portal providers
I.1	Online Lab Repository (incl. Graasp and Golabz)	XXX free	XXX free	XXX free	XXX free	XXX free	XXX free	XXX free	X free	X free
I.2	Bartering (Tutoring) Platform (exchange of tutoring time between the users based on virtual currency)	XXX free	XX free	X free	XXX free		XX free		X free	
	Add. Service: Using expert tutoring services	XX paid/ sponsored	XXX paid		XXX paid		XXX paid		X paid	
	Add. Service: Offering expert tutoring services		XX paid			XXX paid	XX paid	XXX paid	XX paid	
	Add. Service: Exchange of online lab usage time					XX free		XXX free		
I.3	App Composer	XXX free	XXX free		XXX free	X free	XXX free	XX free		
II.1	Online Labs (remote, virtual, data sets) – providing or gaining access to non-commercial labs	XXX free	XXX free	XXX free	XXX free	XXX free	XXX free	XXX free	X free	
	Add. Service: Providing access to commercial online labs					XXX paid		XXX paid		
	Add. Service: Gaining access to commercial labs	XXX sponsored	XXX paid	XXX sponsored	XXX paid		XXX paid	XXX paid	X paid	
	Add. Service: Providing access to Go-Lab Labs in another web portal								XXX free for Go-Lab labs, paid for commercial labs	XXX free for Go-Lab labs, paid for commercial labs

Result Nr.	Planned exploitable result/ Additional Service	School teachers	Researchers/ Instructional Design.	Students	Lifelong Learners	Online Lab providers	Educational providers	Combined providers	Museums/ Science Centers	Web portal providers
II.2	Inquiry Learning Applications	XXX free	XXX free	XXX free	XXX free	X free	XXX free	XX free	X free	
II.3	Inquiry Learning Spaces	XXX free	XXX free	XXX free	XXX free	X free	XXX free	XX free	X free	
III.1	Classroom scenarios handbook	XXX free	XX free		X free	X free	XXX free	XX free	X free	X free
III.2	Guidelines and supporting materials for teachers	XXX free	XX free		XX free	X free	XXX free	XX free	X free	X free
III.3	Recommendations for the introduction of online labs in schools	XXX free	X free				X free		X free	
III.4	Participation in Go-Lab training and support activities	XXX sponsored	X paid				X paid			
III.5	Go-Lab MOOC for school teachers	XXX free	XX free		XX free	X free	XX free	XX free	X free	X free
	Add. Service: Participant Certification	XXX paid	X paid		X paid	X paid	X paid	X paid	X paid	X paid
	Add. Service: Using expert tutoring services	XXX paid/ sponsored	XX paid		XXX paid	X paid	XX paid	X paid	X paid	X paid

3.1.5 Standardization[29]

To strengthen the standardization and adoption of the Go-Lab technology, representatives of WP4 and WP9 are involved in the IEEE Working Group P1876 on Networked Smart Learning Objects for Online Laboratories. This group is sponsored by the IEEE Education Society. Institutions and projects cannot be represented in such a group, only personal participation is possible. However, EPFL, UNED, CUAS and UD representatives are core members of this group and are contributing effectively thanks to the competencies and the solutions incubated, prototyped, implemented and validated in the Go-Lab project.

In addition to online meetings, three face-to-face meetings have already been held; one during the IEEE EDUCON conference 2013 in Berlin, one during the IEEE EDUCON conference 2014 in Istanbul, and one during the FIE conference 2014 in Madrid.

During the second meeting it was discussed to define the standard at three levels: a pedagogical level, a service level, and a communication protocol level. The pedagogical level is describing how to package resources in a standardized way and to enable their integration in learning environments (e.g. LMS, MOOC platforms or social media platforms). The ILSs as defined in Go-Lab are instrumental at this level to conceptualize the pedagogical packaging. The service level is standardizing the way a client communicates with a remote lab. The abstraction layer provided by the Smart Device paradigm was well received as a proposal and has the potential to become the seed of the final IEEE specifications still to be drafted and finalized. Finally, the communication protocol level is standardizing the way all the loosely coupled services and platforms supporting the usage of remote labs could interoperate. The Smart Gateway proposal is showing directions and scheme for effective interoperability.

Furthermore, the draft structure of the IEEE P1876 has been discussed with lab owners during the Madrid workshop at UNED in June 2014 and useful feedback has been collected. This feedback will be shared with the Work Group and contribute to align the standard with the Go-Lab vision and the lab owners' expectations.

During the meeting in October 2014, current state of specifications defined in the Deliverable D4.1 "Specifications of the lab-owner services and cloud services – initial" (M21) were presented. Advances in the creation of data models and communication protocols between servers and remote laboratories were shown. Miguel R. Artacho (UNED) was nominated as a co-editor of the standard proposal draft. The next meeting of IEEE P1876 will be held during the IEEE EDUCON 2015 conference in March 2015 in Tallin, Estonia, and the first standard proposal draft will be presented and discussed in a workshop in scope of the FIE 2015 conference in October 2015 in El Paso, Texas, USA.

3.2 Individual exploitation plans of the partners

In this section individual exploitation plans (IEP) of the project partners are provided. Each IEP contains a short description of the partner organization, its core business and its relation to the Go-Lab project, a list of planned and achieved exploitable results for the partner, characterization of addressed target groups and their benefits in context of Go-Lab, a sustainability and exploitation plan considering transfer of Go-Lab results and own use of the results by the partner. Specific of partners' business and its role in the consortium determine which projects results will be exploited to which target groups. These IEPs will be annually updated by the project partners; the versions of Year 3 and Year 4 will also contain overviews of exploitation preparation activities that have already been conducted.

[29] Documented also in D4.1 (M21)

3.2.1 University of Twente, UT

Core business of the partner

The University of Twente is a middle-sized Dutch university of technology with approximately 6,000 students and 2,500 staff members. The University of Twente is represented in the Go-Lab project by the Faculty of Behavioural Sciences, and more specifically, the Department of Instructional Technology. The Faculty of Behavioural Sciences offers Bachelor and Master Programs in disciplines relevant to the Go-Lab project, such as educational science & technology, communication science, psychology, and teacher training. The Department of Instructional Technology houses approximately 25 staff members with a background in psychology, educational science, or computer science. The Department's core focus is on inquiry-based science learning in primary and secondary schools. Staff members have rich experience in the design and evaluation of technology-enhanced learning environments, many of which are used in schools (e.g., the KMQuest game). A number of learning environments have even been commercially published in the Netherlands (SimQuest applications) and world-wide (ZAP simulations).

Planned and achieved exploitable results

In the Go-Lab project the main roles of the Department of Instructional Technology are (next to coordination) in the instructional design field and the evaluation. The department is the leading partner on the development of software scaffolds for students. Next to this, a number of online labs have been developed (e.g., Splash, Electricity, and Gears). New labs are under construction. The UT is also developing pedagogical scenarios, workshop formats, teacher guidelines and materials, and is forming a teacher community in Netherlands which will be maintained project time. Techniques developed under the learning analytics workforce in the project will also be re-used in other applications.

Addressed target groups and their benefits

The UT addresses the following main groups of stakeholders:

- School teachers who can use the online labs and ILSs that are developed and who will be trained at the UT in inquiry learning and the use of technology in the classroom.
- University students who will have access to Go-Lab pedagogical scenarios to learn about instructional design.
- Research organisations that will be able to re-use Go-Lab scaffolds in their research proposals.

Exploitation and own use planning

The UT will maintain and further develop the Go-Lab scaffolds (concept mapper, hypothesis scratchpad, experiment design tool, conclusion tool, and reflection tool) after the project time. These scaffolds will be made available for free and it is expected that international cooperation will emerge around the development of these tools. Also, the online labs developed by the UT will be maintained and extended in cooperation with teachers and schools.

Since the core activities of our organisation lie in the research and teaching area, Go-Lab exploitation focuses on these two areas. For research (projects) the developed scaffolds will be reused in different contexts. Scaffolds like the Concept Mapper have a general function that can also be used in other projects. The use of web technology, as it is done in Go-Lab, is instrumental for this. The labs that were developed in the context of Go-Lab will be made available for teachers and schools and will form an impetus for new collaborations. The structures that are

developed in the pedagogical area find their way into our teaching programme and are examples for students on the design of learning environments.

3.2.2 Ellinogermaniki Agogi, EA

Core business of the partner

Ellinogermaniki Agogi (EA) is an educational organization of private law, officially recognized by the state. EA was the first Greek educational organization, which applied ODL in secondary level education in the year of 1993. It is an institutional member of EDEN (European Distance Education Network), of STEDE (Science Teacher Education Development in Europe) network and of ECSITE (European Network of Science Centres and Museums) network.

Since 1998, the organization has its own Research and Development (R&D) Department for the design, development and implementation of research activities in education, expanding the collaboration with universities and research institutions across Europe. The R&D Department acts as an interface between the pedagogical research, the technological innovation and the school community. The work of the R&D Department, which currently employs 20 full time researchers, focuses on the following areas: development of methodologies and empirical research to investigate processes of learning and knowledge acquisition in various subject-matter areas, collaboration with computer science departments and artificial intelligence labs for the development of computational models and eLearning systems, collaboration with universities and private companies for the development and testing of educational software, design of technology-supported learning environments.

Planned and achieved exploitable results

In scope of the Go-Lab project, EA is involved in the coordination of the implementation activities in 1,000 pilot schools across Europe, as well as in the selection and proposal of online labs to be included in the federation of online labs. The Go-Lab consortium partners are developing the Go-Lab Repository, where all labs are collected and which will be the main entry point and workspace of the pilot schools science teachers and users in general during but also after the end of the project.

Also, EA is involved in the development and support of a community of science teachers and practitioners who will act as change agents after the project ends. EA is developing teacher guidelines, educational scenarios and lesson plans, documents best practices, etc.

Addressed target groups and their benefits

With the project results (Go-Lab Repository, community of practitioners and change agents, educational scenarios and guidelines) EA targets the following groups of stakeholders:

- *Online lab owners* (also beyond the Go-Lab consortium) are able to provide access to their labs via the Repository and be a part of a larger federation of online science labs and applications that support inquiry learning at school. Further, they have the possibility to get visibility to a wider audience of users, educators, students and researchers.
- *School teachers* are able to use the developed educational scenarios and online resources, search and find online labs, learning apps and ready to use Inquiry Learning Spaces and use them in their everyday practice. As part of a wider community, they will be able to receive support from experts or other more advanced users of the Go-Lab infrastructure, exchange ideas and experience to overcome difficulties and barriers.

Exploitation and own use planning

EA is planning to develop the usage guidelines and best practices in English, but also in Greek, Romanian and Bulgarian, to facilitate the use of the Go-Lab platform and services in a sustainable way after the end of the project in these countries. These will be offered to the users and the community for free and will also support the wider dissemination of the project's educational methods and outcomes. With respect to the developed community of contacts, educators and science teachers EA is planning their further support, communication and guidance since its role is significant and critical, if they are foreseen to become the main seeds of innovation in science education during and after the end of the Go-Lab project.

3.2.3 École Polytechnique Fédérale de Lausanne, EPFL

Core business of the partner

The École Polytechnique Fédérale de Lausanne (EPFL) is one of the top European Universities participating in numerous national and international research projects. The Coordination and Interaction Systems Group (React) belongs to the EPFL School of Engineering and carried out research in Technology Enhanced Learning (TEL) and Knowledge Management (KM). The group focuses on real-time and ubiquitous human-machine interaction; collaborative, personal and social learning; coordination and interaction with distributed smart devices for remote experimentation; as well as ubiquitous knowledge and resource management. React contributes to the advancement of rich Web 2.0 service integration and interoperability with its flagship social media platform called *Graasp* (http://graasp.epfl.ch). React is also prototyping advanced solutions for digital privacy enforcement, cloud resource aggregation and online community support.

Currently, the *Graasp* platform is expended as an Inquiry Learning Space (ILS) Factory and a teacher community support platform in Go-Lab, as field learning and agile knowledge management platform in collaboration with the non-governmental organization *Doctors without Borders*, and as a constructivist MOOC platform within a community of practice supporting collaborative learning and research in French-speaking countries.

Planned and achieved exploitable results

The successive versions (current prototype, initial, final and sustainable) of the ILS Factory (Graasp) enable Go-Lab pilot teachers and future science teachers interested in using Go-Lab resources in their STEM class to create, repurpose and/or share Inquiry Learning Spaces targeting dedicated inquiry learning classroom activities using online labs through mainstream browsers or on mobile devices. Go-Lab will push further the Open Educational Resources (OER) paradigm by offering ILSs as resources embedding rich pedagogical content and services, the latter being contributed by experts and teachers as open social applications under creative commons licenses.

The smart device specifications developed within Go-Lab and standardized in the IEEE framework will enable the consolidation of the lab owner communities, strengthening the offer of remote laboratories targeting secondary and high schools, and enable the creation of a set of interfacing client applications targeting different public and different learning scenarios for a given remote lab.

Learning analytics backend based on activity stream and dashboards offered as open social applications embedded in ILS will enable teachers to have a better understanding of the progresses of their students and students to position themselves in the classroom and follow the activities of others, while guarantying their privacy.

Addressed target groups and their benefits

The results described above provide *Lab owners* with the ability to more easily plug and pack in ILSs and share remote laboratories; *Teachers* to more easily find, repurpose and share rich and pedagogical sound ILSs; and last but not least *Students* to carry out in one click without complex login inquiry learning activities with structure and scaffold as parts of personalized ILSs.

Exploitation and own use planning

The sustainable version of the Go-Lab Portal, and especially the ILS factory (*Graasp*), will continue to be developed and offered as an open platform to the European education community after the end of the project for a few years. Sustainability will be ensured though internal projects (related to MOOCs and MOOLs, i.e. Massive Open Online Labs), national projects (as a platform to support personal learning for master and PhD students, as well as school teacher communities), and at the European level to support secondary school teachers in developing and sharing educational resources.

The new *Graasp* feature enabling to package open educational resources and services as portable ILSs is envisioned to be one of the main adoption factors. Online labs, as well as the corresponding interfacing and support apps will continue to be offered under creative commons licenses.

In parallel to the academic exploitation, we envision to establish a spin-off providing the above platform and related services to non-governmental organisations and business companies. Licensing of *Graasp* is currently discussed between EPFL and the spin-off company.

Outreach to secondary schools to raise interest for scientific education and carrier is an important objective of EPFL. The outcome and the resources currently developed in Go-Lab will hence be exploited and further developed after the end of the project for this purpose. The links established with the Swiss teacher communities will also be consolidated.

3.2.4 EUN Partnership aisbl, EUN

Core business of the partner

European Schoolnet is the network of 31 European Ministries of Education, based in Brussels. As a non-profit organisation, EUN aims to bring innovation in teaching and learning to its key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners. Since its founding in 1997, European Schoolnet has used its links with education ministries to help schools make effective use of educational technologies, equipping both teachers and pupils with the skills to success in the knowledge society.

European Schoolnet provides both Ministries and schools with: information and services relating to the innovative use of educational technology; outreach campaigns on specific educational topics such as maths, science and technology; and research activities. In particular, we pledge to: (1) Support schools in achieving effective use of ICT in teaching and learning, (2) Improve and raise the quality of education in Europe , and (3) Promote the European dimension in education.

Planned and achieved exploitable results.

In scope of the Go-Lab project, EUN is mainly involved in the organisation of the School Pilot activities and the support of Go-Lab schools plus the evaluation of the Go-Lab interventions by both teachers and students. As a result, EUN interested in the evaluation analysis results which will measure the impact that Go-Lab will have on teachers' and students' knowledge, motivation, attitudes and intentions, when it comes to the use of online laboratories and STEM in general.

The collection of online and remote laboratories as well as Go-Lab Portal and the collection of Inquiry Learning Spaces (ILSs) are also of major importance and interest for STEM, and not only, teachers. These resources and tools can form an excellent starting point for teachers who wish to discover and experiment with the use of online laboratories within their classrooms.

The policy recommendations regarding the introduction of online/remote laboratories in schools will also be particularly valuable information that EUN can communicate to the Ministries of Education participating in its Steering Committee which will then reach the respective national policy makers.

Addressed target groups and their benefits

With the project results described above EUN targets the following groups of stakeholders:

- *School teachers* will be able to find and use online labs, learning apps and Inquiry Learning Spaces and receive support from the experts and teacher community in using Go-Lab infrastructure and creating their own ILSs. All Go-Lab related resources will become available through Scientix and other related EUN platforms.
- *Policy makers* will be also provided with project's evaluation results on the impact of using online laboratories in the classroom as well as with the extended set of recommendations for the introduction of online laboratories in schools. In this case, the aim will be to open and positively influence (on national and European level) the discussion on the use of online laboratories, their benefits and the ways to gradually support and expand their use of online labs in European schools.

Exploitation and own use planning

EUN is planning to promote and use all Go-Lab related resources (ILSs, remote laboratories) by populating them to its network and by using them as a part of training material being developed in collaboration with the EUN Academy. All resources will become available through Scientix (http://www.scientix.eu), which promotes and supports Europe-wide collaboration among STEM teachers, education researchers, policymakers, and other STEM education professionals. Learning apps and ILSs can in this way become available to a wide audience and reach out to countries beyond the ones officially participating in Go-Lab. Any resources created under Creative Commons allowing derivatives will be eligible for the translation on demand of Scientix. Go-Lab resources can also be used as a part of Future Classroom Laboratory (http://fcl.eun.org/) presence and/or online courses. Go-Lab is already a part of the EUN Academy STEM MOOC[30] which completed its first round by May 18th 2014 and will start its second round on August 18th 2014.

Project's evaluation results and the recommendations for the policy makers will be provided and discussed with EUN's Steering committee, which is composed by members of 30 Ministries of Education from Europe and beyond. The results in combination with the targeted recommendations can also be presented during Eminent, an annual event organised by European Schoolnet which mainly aims at providing policy makers and industry partners with the most up-to-date information regarding the latest trends on ICT use in schools and identifying current roadblocks and areas that need to be addressed in the immediate future.

[30] http://www.europeanschoolnetacademy.eu/web/innovative-practices-for-engaging-stem-teaching-ii

3.2.5 Information Multimedia Communication AG, IMC

Core business of the partner

As one of the leading European software vendors for learning technology, IMC's general competencies lie on design and engineering of software solutions for learning, learning and talent management, authoring, Web 2.0 community technologies as well as knowledge management. IMC is also strong in providing consultancy services to organizations in the public sector on learning strategies, implementation and rollout of learning solutions. Many IMC technologies and products came out of research activities on national and international level – as IMC itself was created as a spin-off out of university research in 1997.

IMC is also a technology provider with high skills on integrating learning technologies in existing business-process-oriented infrastructures at companies, within public sector organizations as well as higher education institutions. IMC's core business model is based on selling software (e.g., Learning and Talent Suite, Content Studio, and Business Process Guidance Suite) to corporate and higher education clients and providing services around these technologies. Since 2013 IMC also offers free MOOC platform OpenCourseWorld providing online courses for vocational training.

Planned and achieved exploitable results

In scope of the Go-Lab project, IMC is involved in the development of the Go-Lab Repository and the Bartering (Tutoring) Platform, which will be hosted and maintained by IMC after the project time. Furthermore, IMC creates (with support of other project partners) a MOOC for school teachers "Using Online Labs in the Classroom: an introductory course for teachers" introducing the Go-Lab Portal and online laboratories with the aim to train course participants in using Go-Lab infrastructure. The course will be available during and after the project time giving teachers the possibility to learn about Go-Lab without attending a presence workshop (for more information, please see Section 2.3).

Addressed target groups and their benefits

With the project results described above IMC targets the following groups of stakeholders:

- *Online lab owners* will be able to provide access to their labs via the Go-Lab Repository. Further, they will have the possibility to provide tutoring services accompanying the labs via the Bartering (Tutoring) Platform (e.g., experts from the lab owner side will consult online lab users in how to handle the lab and how to apply it for a particular lesson plan). After the project time, IMC will be the main contact for new online lab owners wanting their labs to be present in the Repository. IMC will do the quality check of the labs and consult the lab owners on how to integrate their labs into the Repository and how to use the Bartering (Tutoring) Platform.
- *School teachers* will be able to use the Repository and the Bartering (Tutoring) Platform to find online labs, learning apps and Inquiry Learning Spaces and receive support from the experts and teacher community in using Go-Lab infrastructure and creating own ILSs. Moreover, the MOOC will be available for the existing teachers using Go-Lab and for new teachers providing demos, practical tips and hands-on activities with the Portal and online labs.
- *General public* (researchers, parents, students, etc.) will be able to access and use free Go-Lab facilities and tools and learn about Go-Lab with the MOOC.

Exploitation and own use planning

The Go-Lab Repository will be maintained by IMC and populated with online labs and learning applications to become a central portal for teachers to access online labs. Furthermore, the technology will be used for the development of learning application platforms in new research projects of IMC. IMC will check, whether the portal can be used after the project also for other forms of project based learning and can be offered to educational institutions for a fee.

On the Bartering (Tutoring) Platform, apart from free support from teacher to teacher, expert support services will be offered by the Go-Lab consortium members and online lab owners at a charge. The Bartering (Tutoring) Platform will be further developed by IMC to become a community for exchanging tutoring and support time. IMC will after the project try to integrate the Bartering (Tutoring) Platform with its OpenCourseWorld Platform. This would allow IMC to offer tutoring services to learners for a fee on top of the free MOOC courses. A pool of freelancers, selected by IMC, could serve as tele-tutors and IMC would charge a commission on the payment made by learners to the tutors.

The MOOC will be offered for free at the OpenCourseWorld-platform (developed and maintained by IMC) for at least one year after the project finish. Certificates of completion will be provided at a charge. Also, the MOOC will be linked to the Bartering (Tutoring) Platform, so learners can receive support.

3.2.6 MENON Network, MENON

Core business of the partner

MENON is a European innovation and research network, which provides information, evaluation, consultancy and development support to policy makers, research communities, industry and society at large on issues related to learning, and how learning is linked to organizational and social developments. The mission of MENON is to facilitate the evolution of the Knowledge Society in Europe and in other parts of the world. The MENON Network is active both at national level, through its members, and at transnational level, where the EEIG coordinates co-funded projects, and is active in other collaboration and support work for the European Commission and international organisations. We have been working in more than 30 countries, where we can count on an extended network of partners and experts. MENON has been successfully coordinating more than 30 research projects, being in charge of management, research coordination, dissemination, European and international networking, and sustainability building.

The Hellenic Association for Education (HAEd) runs a plethora of activities rendering it to a prominent stakeholder in the area of learning innovation. It has established a Research Centre (RC) in order to facilitate state-of-the-art in education in both the Greek and the European context. The RC conducts R&D activities through its participation in various EU-funded projects under the FP7 and LLP frameworks. HAEd is collaborating closely with MENON office in Athens, which supports the broader research activities of HAEd, provides guidance and facilitates policy makers, conducts research activities, and leads the Programme for School Innovation (http://www.protovoulia.org) for the school education in Greece, which aims at the quality upgrade of education, while ensuring equal opportunities to learning for all members, especially its youth, of the Greek society. Additionally, HAEd has entered collaboration with the University of Dundee (UK), the School of Education, Social Work and Community Education, offering the latter's four-year MA (Hons) Programme in (Primary) Education. Furthermore, it consistently works with the University of Dundee and other European Universities, in order to gradually build a significant and reliable cluster of undergraduate as well as graduate programs, in the knowledge domains of Pedagogy, Education, Social and Political and Health Sciences.

Planned and achieved exploitable results

In Go-Lab project MENON Network is responsible for the Community building and support (WP6). The communities of WP6 will be used to collect feedback for the smooth development of the project and they will be the main channel of sustainably and exploitation. First of all, the communities of teachers, lab owners and educational policy makers will be used in order the results of the Go-Lab project to be released to the wider educational community. The main results of the project to be exploited is the methodology used for the implementation of the ILSs, which will be presented as a state of the art approach to similar initiatives related to the development of e-learning tools for science education. This methodology which is based on the Inquiry Based Learning approach can be implemented in similar disciplines and can be used by the schools participating in MENON's Program for School Innovation, which implement such kind of activities.

Furthermore, in European level, MENON, as a leading educational and innovation network, is going to exploit Go-Lab results in terms of the experience gained during the different phases of the project. This experience mainly refers to the emerging trends and changes in learning in science education across Europe, which reflects the new approaches both on didactic practices and the introduction of ICT driven innovation in education. This would be a useful result for policy making.

On the other hand, the exploitation of project's results in scientific terms is going to take place through HAEd, a member of MENON Network. HAEd, as an education provider, is going to integrate some of the final results of the project, such as the methodology of the e-learning approach, to the degree educational programmes it offers and especially in four-year MA (Hons) Programme in (Primary) Education. Furthermore, these developments in the discipline of pedagogy are going to be scientifically examined by the modules offered within the framework of the above programme.

Yet, the methodology and the format used in the training workshops and the material produced are going to be integrated to the professional development programmes for teachers that HAEd plans to establish.

Addressed target groups and their benefits

HAEd Network will try to disseminate and make common practice the use of online labs to the school community in Greece. As referred, this is going to be established through Program for School Innovation (PfSI), which has as main goal to provide training and support to K-9 teachers and schools in order for them to establish those conditions which favour sustainable educational innovation within the school environment. The PfSI addresses many aspects of school education and introduces a state-of-the-art pedagogical approach to instructional, competence-based design and assessment, deploying the Key Competencies (the new literacies) agenda, while it proposes action on two tracks: the school development and the teacher professional development. One core target of PfSI is to use the practice gained from the Go-Lab project in order to establish the use of OnLine labs as a part of the school practice. The schools taking part in the PfSI are supported by teacher trainers, who are responsible for their training in Go-Lab system among others. On top of it, Costeas-Geitonas School, as a HAEd's affiliate organization, plans to adapt to some extent its curriculum to the project's results (use of Go-Lab labs).

A second target group will be the policy makers. MENON Network, as co-partner of Institute of Educational Policy in Greece (IEP) in various research projects, has described a common framework for all innovation projects in Greek schools. This framework meets the needs for the integration of the innovation Go-Lab offers and, according to the final results of the project, it will

be proposed the establishment in institutional level of the use of online labs in all schools of the country.

Exploitation and own use planning

For the current needs of the project is going to be developed an online community of teachers, which will be also useful for the sustainability of the project. The target is this community to avoid Go-Lab portal becoming obsolete. This means that authorized advanced users (mainly interested teachers), who are members of the above communities, can propose to the repository maintained by IMC new ILSs that introduce a new dimension, according to the latest develoments and trends in the field of science education. By this way, Go-Lab labs will be kept up to date in a way that reflects the latest developments in the fields both of science education and pedagogical approach.

3.2.7 Universidad Nacional de Educación a Distancia, UNED

Core business of the partner

The National Distance Education University (UNED) has as its mission the public service of higher education through the modality of distance education.

UNED features the most complete and advanced methodology for distance learning, putting a whole range of measures and human resources at the disposal of students to enable autonomous learning tailored to their needs and schedules. Based on the use of active methodologies in which students are the protagonists of their own learning, this system is the underlying concept of the European Higher Education Area (EHEA) for the training of professionals capable of taking up the challenges of the knowledge society.

UNED provides instruction by means of a distance learning modality characterized by the use of a specific didactic methodology. The methodology combines the use of print and audiovisual media with that of new technologies, especially virtual learning communities. There are also various systems of communication between professors and students as well as on-site assistance to students from professor-tutors at the Centres.

Planned and achieved exploitable results

In respect to the Universidad Nacional de Educación a Distancia is involved in developing a new specification for remote laboratories, adapting legacy laboratories to be used in the Go-Lab infrastructure, creating learning Apps and provide an App composer to design or repurpose user interfaces to online laboratories or scaffolding applications.

UNED will use the Go-Lab repository to store the developed laboratories that follow the new specification, and learning apps. It will also be able to provide an app composer. This tool will be offered to teachers to adapt user interfaces.

Addressed target groups and their benefits

With the project results described above UNED targets the following groups of stakeholders:

- International associations, such as GOLC (The Global Online Laboratory Consortium) and IEEE, will be able to consider the new specifications for remote laboratories as a possible e-learning standard for the lab owner community.
- Online lab owners will be able to create new remote laboratories, based on the new specification and store them in Go-Lab repository. It will also be able to adapt their legacy labs. All these labs can the offered services by Go-Lab infrastructure, such as Go-Lab Portal or Learning analytic.

- School teachers will be able to use the remote laboratories and learning applications from the Repository. They will be able to use the app composer to design or repurpose user interfaces to online laboratories or scaffolding apps. Both remote laboratories as learning apps are the basic component to create ILSs.
- Additionally, schools can benefit from our own resources shared with Go-Lab. Recently we performed a remote demo for Ramiro de Maeztu High School[31] of the Robotic Arm laboratory presently installed in UNED showing basically the commands that can be used to handle the different elements: clamp, wrist, elbow, etc.
- General public (researchers, parents, students, etc.) will be able to access and use free Go-Lab facilities and tools.

Exploitation and own use planning

The new specification for remote laboratories gives a new vision to design and create laboratories in the Internet of things. UNED will work in the creation of new remote laboratories, based on the specification, and will try to get that this specification becomes a learning standard. The UNED also will offer expert support to lab owners to create new remote laboratories and integrating them in the Go-Lab Infrastructure.

New learning apps and remote laboratories will be created to allow teachers to enrich their ILSs. These Learning apps and remote laboratories will be stores in the Go-Lab repository. In some cases, they will be in the battering platform.

The UNED will contact schools to offer the use of our remote laboratories and learning app in Go-Lab infrastructure.

3.2.8 University of Leicester, ULEIC

Core business of the partner

The University of Leicester is a leading UK University committed to international excellence through the creation of world changing research and high quality, inspirational teaching. Leicester is the most socially inclusive of Britain's top-20 leading universities. It is structured with four Colleges. The Department of Computer Science (hereafter: ULEIC), which is a partner in Go-Lab, falls under the College of Science and Engineering. The College has around 440 staff, 2,000 undergraduate and 900 postgraduate students. Our College is home to several specialized multidisciplinary, interdisciplinary and intra-disciplinary research centers, engaging with increasing effectiveness with business and industrial partners. Amongst other, the activities include Space Research, Environment and Climate Change Research, Computational Modelling, Bio-Engineering, etc.

ULEIC is a young and dynamic department in the midst of rapid expansion in the scope of its research and teaching activities. Research in ULEIC currently contributes to eight broad themes with *Interaction Design and Evaluation of Socio-technical Systems* being a more recent one. ULEIC is involved in several national and international research projects and networks and has links with international and UK research groups. Within the University, there are links with the departments of Mathematics, Physics and Astronomy, Engineering, History of Art and Film, the School of Museum Studies, the School of Biological Sciences, and the School of Archaeology and Ancient History.

[31] More details in Go-Lab Report 317601

Planned and achieved exploitable results

The Leicester team in Go-Lab is mainly responsible to plan and implement participatory design (PD) activities with teachers and students from primary schools, secondary schools and universities. The PD methodologies we have been developing since the early stage of the project will mature towards the end of its third year when WP3 will be concluded. Publications on the methodologies, their applications in a range of contexts and associated challenges will be presented in academic conferences and journals. The validated methodologies can be generalized to other R&D projects across different domains (e.g., healthcare). Through the PD activities, we have and will get connected to some local educational institutions and research centres interested in deploying online labs. Leicester can provide them with some consultancy services on adapting and further improving the usability of the online labs concerned. In particular, the collaborative relationship between the University of Leicester and National Space Centre in Leicester can further be substantiated, leading to future research projects at the national and international level.

Addressed target groups and their benefits

Leicester's exploitation activities will focus on the following target groups:

- *School teachers*: With the usability enhanced through the data obtained from the PD workshops, the online labs will become highly usable, desirable and pleasurable to use, enabling their integration into regular science learning activities. This will lighten the workload of teachers for preparing learning material. Besides, teachers can have better technological support to monitor individual students' progress and provide timely interventions.
- *Students*: The useful and usable online labs will enhance students' motivation to deploy the labs for learning the related topics more effectively and efficiently. The general positive experiences (e.g., enjoyment, excitement, pleasure) derived from using the well-designed labs will boost their confidence as well as pride in learning science. This will eventually have strong impacts on the choice of their future career.
- *Educational institutions*: With happier teachers and students, the general working and learning atmosphere is encouraging. This will eventually lead to more positive attitudes and higher performances towards science learning, formally as well as informally, which is currently much promoted in the British educational institutions. Stronger learning outcomes are also accountable for parents and funding agencies, if appropriate, and boost the reputation of the institution concerned.
- *Research centers*: New insights into the design of optimal user experience for teaching/learning with online labs will stimulate more research along this inquiry. This is especially relevant to the increasing popularity of MOOCs, which rely much heavily on the high usability of online learning materials when users self-regulate their interaction with online resources with minimal support from tutors.
- *General public*: The visibility of the online labs to the general public should be improved. Through Leicester's internal newsletter and external outreach activities, the potential of online labs as cost-effective learning technologies will be broadly disseminated. This aligns well with the general policy of the University and Research Councils UK to emphasize on widening the impact of research work within and beyond academia.

Exploitation and own use planning

Leicester is keen on pushing on the frontier of its research to MOOCs, especially from the perspective of user experience (UX). The existing collaboration with Google (Zurich), which is a key player in MOOCs, YouTube and similar endeavour, will facilitate the augmentation of our

research plan. Specifically, as users of a MOOC are expected to consume online learning resources mostly on their own accord, the usability of a MOOC is extremely critical for its success. If the user is deterred by the poor usability of a MOOC, it is likely that she will quit. One significant means to ensure the usability of an interactive system is to build it with strong participatory design (PD) methodologies, which are grounded in the established user-centred design (UCD) principles. Hence, based on our years of experience in the field of Human-Computer Interaction (HCI), we plan to offer training workshops in the form webinars/face-to-face events and consultancy services on usability and UX design and evaluation methodologies for researchers and practitioners working on MOOCs and similar endeavours in the future. Finally, ULEIC experience and knowledge in the field of usability of MOOCs will be incorporated in the Go-Lab MOOC, which will be available during and after the project time.

3.2.9 University of Cyprus, UCY

Core business of the partner

The University of Cyprus is a public University with approximately 4,000 undergraduate and 1,000 masters and PhD students. The Department of Educational Sciences at the University of Cyprus is a large department with 22 members of the faculty, and 35 associate or assistant personnel. We have two undergraduate (primary and pre-primary school education) programs, a pre-service post-graduate secondary education program (across all subject domains taught in secondary education) and seven postgraduate programs at the Masters and PhD level (including science, math and technology education). In Science Education we are active in research into inquiry learning, computer supported collaborative learning, physical and virtual laboratory experimentation, modelling, science curriculum development and assessment, conceptual understanding and educational evaluation.

The Research in Science and Technology Education Group (ReSciTEG) at the UCY conducts a coordinated program of research, curriculum development and instruction. ReSciTEG is currently engaged in three major projects: the use of virtual and remote labs in the context of inquiry-based (science) learning; development of computer supported inquiry learning environments; raising youth awareness about responsible research and innovation through inquiry-based Science Education. Also, the group is taking a leadership role in the efforts of the UCY to implement its eLearning strategy through a series of pilot projects including topics such as ICT in science. Our work has received continuous financial support over many years from the Cyprus Research Promotion Foundation and the European Commission (e.g., IST, Science and Society, Socrates, FP 6 and FP 7 programmes).

Planned and achieved exploitable results

Based on the results of the commenced workshops:

- The UCY created a large science teacher and student community willing to participate in Go-Lab and learn more about the pedagogical content knowledge of science online laboratories, inquiry learning and the big ideas of science.
- A number of scaffolding tools and inquiry learning spaces (ILS) have been evaluated and assessed for their functionality and usefulness.
- Go-Lab and its concept/content was introduced and advertised to the science teacher community as an alternative learning approach.

Future workshops will aim in the assessment of the impact of Go-Lab on:

- Pedagogical content knowledge
- Attitudes and beliefs towards science

- Inquiry and technology skills
- Teacher science efficacy belief
- Motivation
- Intention to use Go-Lab
- Understanding of the nature of science

Addressed target groups and their benefits

The targeted groups that will benefit from Go-Lab project include students, teachers and the academic community:

- Students: Will have the opportunity to experience online science labs, virtual or remote, which under regular laboratory or classroom conditions would not be able to.
- Teachers: Will have the opportunity to be trained and use expensive/dangerous and/or otherwise impossible to own laboratories with their students bringing real life science in their classroom.
- Academic community: Will be able to investigate the impact of online science laboratories on student learning and (pre-service) teacher training.

Exploitation and own use planning

Upon completion of the Go-Lab project, UCY will use the designed software (Go-Lab Portal, Go-Lab Repository, Online Labs, Learning Apps, ILSs, Bartering (Tutoring) Platform, App Composer, etc.) in a twofold application. For students and teachers: UCY will use Go-Lab as an exemplary science teaching approach of online labs in schools and as guidelines and supporting materials for teachers. The Go-Lab platform will be also used in science and ICT related courses for training pre-service teachers. In addition, Go-Lab will be used within the science education curriculum of the University of Cyprus for training graduate and undergraduate students in science education majors. This will include university coursework, teacher training and research studies.

3.2.10 Universität Duisburg-Essen, UDE

Core business of the partner

The Collide research group (Collaborative Learning in Intelligent Distributed Environments) is a part of the Department of Computer Science and Applied Cognitive Science within the Faculty of Engineering at University of Duisburg-Essen (UDE). Collide develops innovative software and architectures for learning environments and has been engaged in several European research projects in the area of Technology-Enhanced Learning, among these are the European Network of Excellence Kaleidoscope with a focus on interaction analysis, especially social network analysis approaches for CSCL, learning process modelling and mobile learning. Other research areas pursued in previous European Research projects are: open distributed learning environments and ”collaborative mind tools” (European projects DEMOS, NIMIS, DiViLab, SEED, COLDEX, CONNECT, and SCY) and analysis, modelling, and intelligent support of collaborative learning processes (e.g., an initiative on “Net-based Knowledge Communication in Groups” of the German Science Foundation DFG and ARGUNAUT project). Projects related to knowledge management (e.g., SIBOB) are devoted to developing new methodologies for science evaluation, including social network analysis and data mining approaches.

Planned and achieved exploitable results

In the Go-Lab project UDE is engaged in both technical work packages. As the task leader of the learning analytics task, UDE aims at developing and applying new methodologies for characterizing and supporting learners in inquiry learning scenarios as well as approving patterns for open analytics software infrastructures. Tools resulting from previous European projects, like the SQL spaces (SCY project) for rapid prototyping of multi-agent systems and the Analytics Workbench (SISOB project) are further elaborated and adapted to Go-Lab. Furthermore, UDE is a developer of apps (e.g., Wiki widget) and guidance mechanisms for the ILS platform. This includes in particular self-reflection support for learners through personalized learning dashboards. Virtual labs of various science domains are currently being developed and are designated to become integrated in the online lab Repository.

Addressed target groups and their benefits

At the end of the project, results and experiences will be taken up to foster innovation in the area of Technology Enhanced Learning in collaboration with companies and R&D consortia. Future Go-Lab users, primarily *school teachers*, will use apps and personalization features as part of various Inquiry Learning Spaces. The learning analytics methods and tools developed by UDE will be part of the Go-Lab Portal and are dedicated to *teachers and students*, but also free to be used by *researchers* in order to gain insights in the learning processes taking place in Go-Lab. Indirectly, schools and other educational institutions will also benefit from these developments by adopting Go-Lab technologies.

Exploitation and own use planning

UDE will use the learning analytics software architecture as a generic approach to provide extendable and scalable services for intelligent user feedback and long-term analysis of large educational datasets. It is very likely that the developed concept will be used in future research projects. Apps and guidance features for learners will be further developed after the project runtime and applied in further scenarios and studies. All tools will be distributed through the lab repository.

Besides the developments of online labs for science teaching in schools, the Go-Lab approach has been adopted to create virtual labs to be used at master's class level at UDE. Two labs have already been applied in the lecture "Design of Interactive Teaching and Learning Systems", while further online labs in different domains are supposed to be developed during the project.

3.2.11 Centre for Research and Technology Hellas, CERTH

Core business of the partner

The Centre for Research and Technology Hellas (CERTH) was founded in March 2000 and its mission is to carry out basic and applied research with emphasis to new products and services with industrial, economic and social impact. The Advanced Digital Systems and Services for Education and Learning (ASK) is a research establishment conducting interdisciplinary applied research in Advanced Learning Technologies and Technology-Enhanced Learning. ASK is engaged in research and development activities in several research areas such as: (i) Cloud Computing for Open Educational Resources and Practices, (ii) Context-Aware Adaptive and Personalized Mobile Learning, (iii) Web 2.0 and Social Computing for Learning, (iv) Digital Game and Intelligent Toy Enhanced Learning, (v) 3D Virtual Worlds in Real Education and (vi) Learning Technologies for People with Disabilities. Additionally, research outcomes and results are disseminated and transferred via a number of educational activities that ASK offers such as:

(i) undergraduate and postgraduate courses in collaboration with the Department of Digital Systems at the University of Piraeus, (ii) courses for Teachers' Professional Development and (iii) PhD summer schools.

Planned and achieved exploitable results

Within the context of the Go-Lab project, CERTH is involved in the development of Inquiry Learning Apps (e.g., Input Box, Quizmaster), as well as in the development (with the support of other partners) of the cross-device compatible front-end of the Inquiry Learning Spaces (ILSs) that are authored by teachers through Graasp and exploited by their students. Moreover, CERTH has proposed (with the support of other partners) the metadata model[32] that is being used for characterizing with educational metadata the online labs of the project, so as to be searchable and retrievable from the Go-Lab Repository.

Addressed target groups and their benefits

Based on the project results described above, CERTH targets the following groups of stakeholders:

- *Online lab owners* will be able to characterize their online labs with educational metadata by following the lab metadata model that has been proposed by CERTH and with the support of other partners.
- *School teachers* will be able to use inquiry learning apps developed by CERTH in order to enrich their ILSs and offer them to their students. CERTH will be the main contact point for these inquiry learning apps and will technically facilitate teachers to use them in their ILSs.
- *Students* will be able to use the ILSs that are developed by their teachers. They will be able to use these ILSs also in a variety of mobile devices. CERTH will be the main contact point for ensuring compatibility of the developed ILSs across various devices.
- *Scientific researchers in the field of TeL* will be able to use the proposed online lab metadata model for setting up similar repositories of online labs. Moreover, they will be able to access and use for free the Go-Lab tools in order to gather data and results for future research publications.

Exploitation and own use planning

The inquiry learning apps, which are developed by CERTH, will be also maintained by CERTH during and after the end of the project. Furthermore, it is expected that these apps will be re-used in new CERTH's research projects and they be will also available as open source apps.

The online lab metadata model will be further extended by CERTH in order to support other types of online tools such as games, mobile apps etc. This would allow CERTH to re-use this metadata model in the context of new research projects and produce additional research publications in the field of open educational resources storage, search and retrieval.

Finally, the methodology for applying a responsive design framework towards supporting ILSs delivery to various devices (desktops and mobile devices) will be delivered as part of the educational activities organized and offered by CERTH (such as PhD summer schools).

[32] Documented in the Deliverable D2.1

3.2.12 University of Deusto, UD

Core business of the partner

The University of Deusto (UDeusto) is a private university with 997 members of staff and more than 12,000 students. Academic excellence for the UDeusto is reflected in its commitment to innovative methods of learning, particularly in the new methodology of competence-based learning, own methodology of teaching, learning and assessment in a learner-based approach, and incorporation of new technologies as tool for a quality education with an emphasis in meaningful learning and efficiency. More than 10 years the Faculty of Engineering provides a remote laboratory WebLab-Deusto. The remote lab is integrated in the educational process with LMS, Facebook, and mobile devices. WebLab-Deusto offers different experiments in physics and technologies including logic games.

As a member of the GOLC (Global Online Laboratory Consortium) and IAOE (International Association of Online Engineering) UDeusto focuses on improving collaboration among institutions providing remote laboratories, facilitating users' (students' and teachers') access to federation of remote labs and virtual experiments, and engaging STEM primary and secondary education sector to use laboratory equipment and virtual experiments by means of novel educational software. Besides, the Go-Lab team has a strong background in the application of Semantic Web and Artificial Intelligence techniques to middleware for embedded and mobile system to foster context-aware reactivity.

Planned and achieved exploitable results

In the Go-Lab project UDeusto team plays a mutual role as a technology developer, lab provider and National Agent of Pilot in Spain. Its activities determine a set of instruments – methods and products - that are planned to be used during and after the project time:

- The Go-Lab Inquiry Cycle (developed by Pedagogical Cluster team) will be used for the development of ILS(s) for existing and new remote experiments.
- In addition, UDeusto creates (together with other project partners) a MOOC for school teachers "Using Online Labs in the Classroom: an introductory course for teachers" targeting project pilot participants as well as future users of Go-Lab infrastructure. In this course main features and benefits of the Go-Lab Portal and online laboratories will be presented; the design process of the ILSs will be demonstrated; integration of the online experiments, scientific data and apps in the ILSs will be shown.
- Several ILSs for WebLab-Deusto remote experiments are developed and several more are planned to be created in order to support school teachers and students in applying online laboratory. Moreover, the App Composer and components of the Go-Lab Portal created by UDeusto technical team will help teachers to personalise existing Go-Lab tools.

Indeed, all methods mentioned above, training and teaching materials, supporting technological instruments and remote experiments will be introduced to the teacher community on national, European and worldwide levels encouraging them to use these tools after the project completion.

Addressed target groups and their benefits

Since UDeusto is the remote laboratory provider, *school teachers* are the main target group. They will be able to use the Go-Lab Portal including WebLab-Deusto remote experiments and the Repository of ILSs, Apps and online laboratories of other providers. The Bartering (Tutoring) vPlatform will offer help of the experts and teacher community in using Go-Lab infrastructure and creating own ILSs. Moreover, the teachers will benefit from the designed MOOC providing

demos, practical tips and hands-on activities with the Portal and online labs. The content and materials of organized workshops and seminars will be accessible for teachers as well.

Students/*learners*, *educational institutions,* such as museums, association of teachers and professional networks, and g*eneral public* (e.g., parents) will be able to access and use Go-Lab facilities and instruments.

Exploitation and own use planning

One of main tasks of the UDeusto as a National Agent of Go-Lab Pilots is to bring information, Go-Lab pedagogical methods and technological facilities to the school teachers. Determined by this goal, we explore and exploit all possible ways to reach teachers using

- formal traditional way over schools and its administrations,
- over training government and non-profit institutions (e.g., Berritzegune, País Vasco and XTEC-Cesire, Cataluña),
- professional networks (e.g., Enciga en Galicia)
- and associations, e.g., Plataforma Española de Asociaciones del Profesorado de Tecnología (PEAPT), España and Consejo General de los Colegios Oficiales de Doctores y Licenciados en Filosofía y Letras y en Ciencias de España,
- science museums, for example, Museo Nacional de Ciencia y Tecnología (MUNCYT), Coruña; Museo casa de las Ciencias, Domus, Coruña; Museo Nacional de la Energía, Ponferrada; Museo de Ciencia (BTEK), Bilbao,
- as well as online social media instruments (e.g., blogs Ciencia Viva (http://cienviva.wordpress.com/) and The Wheel of Inventions (http://www.laruedadelosinventos.org/).

UDeusto collaborates with institutions and organizations (some of them are listed above). It is worth mention that by organizing Go-Lab workshops, e.g. visionary and participatory workshops, together with MUNCYT (National Museum of Science and Technology), Coruña, UDeusto is starting exploiting Go-Lab products and WebLab-Deusto remote experiments for educational society opening the project tools to a broad public community.

UDeusto believes that the Go-Lab Repository will be enriched with ILSs developed by its team and in collaboration with school teachers and well as with remote experiments designed and created on demand. Through the Go-Lab Portal, the collections of ILSs, apps and online laboratories will be available; tutoring and expert support will be provided through Bartering (Tutoring) Platform; and the Go-Lab MOOC will be offered to Spanish teachers at the OCW-Platform (hosted by IMC).

3.2.13 Carinthia University of Applied Science, CUAS

Core business of the partner

Founded in 1995, CUAS currently offers 30 study programs and educates almost 2,000 full- and part-time students (having about the same number graduates). Constant further development of the degree programs at CUAS and intensive cooperation with the worlds of business and science, those studying at the university can be certain of a forward-looking education with its finger on the pulse of time. Full- and part-time lecturers, as well as guest speakers from industry and business ensure an interdisciplinary, internationally oriented education. Degree programs are offered in the fields of civil engineering and architecture, engineering, as well as management, healthcare and social issues. The quality of education in CUAS is emphasized through the development of innovative teaching and learning methods, such as blended learning, offering students and professors greater flexibility in the creation of a suitable learning environment.

Planned and achieved exploitable results

In scope of the Go-Lab project, CUAS focuses on the expansion of the Go-Lab federation of online labs, as well as on the conduction of pilot activities and building a national community in Austria. CUAS (together with UDeusto and UNED) is involved in the development of the Smart Gateway, which is a part of the Go-Lab cloud services architecture. The anticipated outcome of this task is a platform for lab owners allowing plugging their labs into the Go-Lab infrastructure. The main impact is the expansion of the community of lab owners and continuous support of new lab owners willing to join the Go-Lab community during and after the project end.

Using available Go-Lab infrastructure allows creation of a wider national teacher community through various activities as planned in WP6 and WP7, like organization of workshops and acquisition of new science teachers that will use the Go-Lab Portal and online labs and tools in their lessons.

Addressed target groups and their benefits

With the project results described above CUAS targets following stakeholders:

Online lab owners of existing lab (legacy) systems will benefit from the outcomes of the task 4.2 (cloud services) since this will enable an easy way for them to plug their system into the Go-Lab platform and therefore benefit from the Go-Lab apps and ILS Platform (Graasp). CUAS is committed to contribute to the expansion of this community during the project as well as after the project end.

School teachers will have a large number of labs, apps and ILSs that can be used or adapted for their individual educational needs. They will also be able to benefit from a wider community and exchange material with colleagues from different countries.

Students will be able to perform online experiments that are embedded in a pedagogical framework with personalized guidelines that are created by their teachers.

Exploitation and own use planning

CUAS is involved in the creation of new Inquiry Learning Spaces that embed its own laboratory apparatus. These laboratory setups include the Blackbody radiation lab, VISIR, Long Jump, etc. These labs will be used and maintained by CUAS during and after the Go-Lab project. Additionally, the technology (e.g. Smart Gateway) that is developed within the Go-Lab project might be used in further research projects. Teachers and students from Austria who use the Go-Lab ILS platform will receive support from CUAS after the project time. CUAS is also willing to provide this support for teachers creating new ILSs and collect their recommendations for further improvements.

3.2.14 University of Tartu, UTE

Core business of the partner

The University of Tartu (UTE) is the oldest, largest and the only classical university in Estonia with about 18,000 students and 1,700 academic staff members. Most of the Estonian teachers of science and technology are educated at the UTE and it is the only university in Estonia where PhD studies in science education are provided. The University of Tartu is also one of the two main universities providing teachers' in-service training in Estonia. The Centre for Educational Technology operates in close collaboration with the Science Education Centre and Institute of Technology and with the Institute of Computer Science, but also with other universities. We also enjoy close cooperation with the AHHAA Science Centre, which specialises in developing new

methods for explaining science and technology to the public and in particular to young people at all educational levels.

The main competence of the Centre for Educational Technology is its pedagogical knowledge related to technology-enhanced science education. The previous studies of the research group concentrated on improving learners' problem solving and inquiry skills through applying web-based learning environments and educational robotics. Special attention has been paid to adaptive support mechanisms to enhance learners' self-regulation and reflection in learning science. Recently, our focus has been partly shifted towards the research questions related to conceptual principles of digital literacy, technology education, technological literacy, and designing applications for an effective learning process for improving skills needed in a technological world, including those necessary for developing new products through solving design problems.

Planned and achieved exploitable results

In context of the Go-Lab project, UTE is involved in the development of pedagogical principles of Go-Lab and in applying and evaluating them in the context of Inquiry Learning Spaces using different online labs and learning tools. UTE also conducts in-service trainings for teachers who use the Go-Lab Portal, Repository, online labs, learning apps and Inquiry Learning Spaces in Estonia and this will be done also after the project has ended. Thus, as a National Coordinator, UTE is going to use and promote Go-Lab's technical infrastructure and methodology, as well as pedagogic scenarios teacher materials and implementation recommendations (the last will be available by the project end).

Target groups and their benefits

The main target group approached by UTE is school *teachers, teacher educators* and, through them, *students*. These stakeholders are the end users of the Go-Lab learning environment and they participate in workshops and courses, in which UTE introduces the Go-Lab project, its benefits and methods. Besides it, UTE also plans to introduce Go-Lab to the *general public* in Estonia as an exemplary outcome of international cooperation, as well as to the *Ministry of Education and Research* to consider its benefits in the context of the Estonian national curriculum. And, finally, UTE will continue applying Go-Lab in its studies that are addressed to the international *scientific researchers' community*. In this context UTE plans to study inquiry processes and development of students' digital literacy, as well as strategies for engaging teachers in inquiry approach.

Exploitation and own use planning

The lessons learned in the Go-Lab project will be implemented in other research projects, e.g., in the FP7 project Ark of Inquiry, which has been launched in March 2014. In Ark of Inquiry UTE also plans to reuse Inquiry Learning Spaces, learning apps and online labs, because this particular project is designed for disseminating inquiry activities that have proven to be effective in other European projects. The research findings gained in the context of the Go-Lab project form an important input for UTE's research in the field of technology-enhanced inquiry learning. Through our studies and publications they will be disseminated and reused in the following studies and in a broad research community.

Estonian teacher community will be supported in using Go-Lab approach and technology also after the project time. UTE will promote the Go-Lab Portal, online labs, learning apps and ILSs, as well as supportive materials for teachers and students and offer teacher trainings introducing the project outcomes to the participants and supporting the use of Go-Lab infrastructure.

3.2.15 European Organisation for Nuclear Research, CERN

Core business of the partner

CERN, the European Organization for Nuclear Research, is one of the world's largest and most respected laboratories for scientific research. Founded in 1954, CERN is one of Europe's first joint ventures and is now run by 21 European Member States. Its core business is fundamental physics, finding out what the Universe is made of and how it works. At CERN, the world's largest and most complex scientific instruments are used to study the basic constituents of matter — the fundamental particles. The instruments used at CERN are particle accelerators and detectors. Accelerators boost beams of particles to high energies before they are made to collide with each other or with stationary targets. Detectors observe and record the results of these collisions. By studying what happens when particles collide, physicists learn about the laws of Nature. The ATLAS and CMS experiments at the Large Hadron Collider, each comprising more than 3,000 physicists and engineers, will make part of their data available to the public for use in education and outreach. They also develop visualization and analysis tools that provide high school students the opportunity to perform measurements using real LHC data.

Planned and achieved exploitable results

Education and outreach activities have been developed in CERN for the last 15 years, to connect a very theoretical and high-level research infrastructure to a broader audience. Two types of programmes have been developed: one centrally delivered at CERN for high school teachers and national teacher programmes delivered in member countries. In both cases, the content is created by scientists, members of CERN staff or members of the experimental teams. Although the actual impact of these programmes is difficult to evaluate, they benefit over thousand teachers on an annual basis.

In scope of the Go-Lab project, CERN is involved in providing Go-Lab federation of online labs and in the implementation activities. CERN will offer access to scientific data from the ATLAS and CMS experiments at the LHC as well as to a series of interactive applications (e.g., LHC Game, CERNLand, Hunt for Higgs) suitable for in-class learning activities. CERN will also develop and integrate Go-Lab ILSs in the framework of the High School Teacher Programmes in which more than one thousand physics teachers participate every year. In addition, several dissemination activities (news articles, videos, presentations) have and will continue to be organized to promote Go-Lab to science teacher communities both nationally and internationally. A powerful means for reaching out to teacher and student communities are virtual visits offered by the ATLAS and CMS experiments.

Addressed target groups and their benefits

School Teachers. CERN has in place an extensive teacher training programme. This has two components:

The High School Teacher Programme featuring an intensive three-week summer session, funded primarily by CERN supported by other organizations in particular countries. The programme accepts applications from individual teachers from CERN Member and Observer States, and there is some support for teachers from non-member states. Applicants are required to provide some evidence of their motivation. The curriculum – which is presented in English – focuses on particle physics, but with excursions into domains such as cosmology, and relevant applied topics such as medical applications and superconductivity.

The National Teacher Programmes are held in all the CERN member countries, with instruction in the local language. CERN provides all materials as well as administrative and technical support, whereas particular countries are responsible for travel and other expenses of the teachers.

Typically, instruction takes place over several days. It is noteworthy that much of the instructional content is created by scientists who are members of the CERN staff or of the experimental teams. In this way, CERN leverages its explicitly international character to provide added value to member countries at no incremental cost.

Each year, more than one thousand teachers participate in the above programmes. Go-Lab can tap into these programmes to connect with school teachers from CERN member and non-member states, who in turn can contribute to and benefit from Go-Lab.

Students and general public. Each year, approximately 80,000 people visit CERN. Almost half of those people are school students. In addition, a large number of people access the laboratory's website. Go-Lab may synergistically tap into CERN's outreach efforts to the general public and students. This can, for example, be achieved by enhancing its online presence via the communication of success stories that demonstrate the educational impact of in-class online experimentation through the Go-Lab Repository. Furthermore, Go-Lab can be promoted by informing student groups visiting CERN, and more specifically selected student groups that will be taking part in hands-on activities at CERN's recently inaugurated *S'Cool Lab*.

Exploitation and own use planning

CERN teacher training programmes will be the primary means through which the project results will be further promoted in an exploitable and sustainable manner to teacher communities from CERN member and non-member states. Student visits, and especially those that will make effective use of the S'Cool Lab, will also play a key role in engaging the high-school students with Go-Lab. Finally, incorporating Go-Lab into CERN's website, especially into its educational section, will have a sustainable impact.

3.2.16 European Space Agency, ESA

Core business of the partner

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA is an international organisation with 20 Member States[33]. By coordinating financial and intellectual resources of its members, it can undertake programmes and activities far beyond the scope of any single European country. ESA's job is to draw up the European space programme and carry it through. ESA's programmes are designed to find out more about Earth, its immediate space environment, our Solar System and the Universe, to develop satellite-based technologies and services, as well as to promote them among European industries. ESA also works closely with space organisations outside Europe.

Providing educational services is a mandatory programme for ESA. The primary objectives of the ESA Education Programme are to: (1) Motivate and enable young people to enhance their literacy and competence in STEM subjects; (2) Inspire and enable young people to consider pursuing a career in the STEM field, in the space domain in particular; (3) Contribute to increase youngsters' awareness of the importance of space research, exploration and applications in modern society and economy.

[33] Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom. Canada takes part in some projects under a Cooperation agreement.

Planned and achieved exploitable results

ESA provides online labs to the Go-Lab consortium, both already existing activities and datasets and newly developed labs. The labs form a key aspect of the ESA Education Programme and ESA is committed to maintain these labs. In addition to the labs being available through the Go-Lab platform and trainings, ESA will continue to include these activities in its own teacher training sessions (for example, ESA/GTTP teacher workshops).

Addressed target groups and their benefits

In relation to the Go-Lab project, ESA's primary target group is school teachers, particularly those involved in the training of other teachers. Teachers are reached via the ESA Education website, the ESA ESERO network and ESA teacher training events.

Exploitation and own use planning

ESA will continue to maintain the software and labs delivered to Go-Lab. ESA will also continue to include the labs delivered to Go-Lab in the teacher training events promoting the Go-Lab Portal and motivating teachers to use its facilities like authoring platform to create Inquiry Learning Spaces, the App Composer and Bartering (Tutoring) Platform.

3.2.17 University of South Wales, USW

Core business of the partner

The Faulkes Telescope Project (FTP) currently provides free access to large, research-grade optical telescopes in Australia and Hawaii, as well as being a partner in the larger Las Cumbres Observatory Global Telescope (LCOGT) network. Through LCOGT, FTP will soon provide access to additional facilities (0.4m and 1m telescopes in other locations around the globe). This access has been given to schools in the UK and Ireland, but is also available to EU schools within the wider Go-Lab project. FTP is based within the School of Applied Sciences at the University of South Wales, a higher education institute in the UK.

In addition to live and queue-scheduled observing, our data archive of previous observations is open to all users, and we provide a large number of educational resources associated with planning observing sessions, image processing and scientific analysis of astronomical data. The archival data consists of over 10 years of astronomical images, many associated with research projects.

Planned and achieved exploitable results

FTP has helped to develop an ILS based on Impact Craters lab and provides data for Galaxy Crash simulation. In addition to these, USW is helping to create a module for the MOOC for school teachers "Using Online Labs in the Classroom: an introductory course for teachers" This course will be available during and after the project time giving teachers the possibility to learn about Go-Lab without attending face-to-face workshops.

In addition, the Down to Earth2 (D2E) education programme is a part of FTP, which has also been made available through Go-Lab, and has been further developed with funding from fellow Go-Lab partner the European Space Agency (ESA). FTP is also working with ESA to produce more educational resources based on e.g. data from solar observatories and ESA's current Gaia and Rosetta space missions.

Addressed target groups and their benefits

FTP provides access to telescopes for schools and educational groups, though these are usually led by teachers, who plan their observations and analysis, often in conjunction with their stu-

dents. In addition, all of the resources on the FTP website are available free-of-charge and without password to the general public. FTP is available to any educational group, primarily secondary schools but also including informal bodies such as amateur astronomical societies, science centres and home education groups.

Exploitation and own use planning

The online labs provided by FTP (Faulkes Telescope, Galaxy Crash, etc.) will be maintained and kept available for the Go-Lab users after the project time. The FTP data archive and instructions will remain online after Go-Lab – this will allow non-password protected access to the data, in order for users to analyse scientific images. It is fully anticipated that FTP will continue to work with several Go-Lab partners (e.g. ESA, Nuclio) on other projects in the future. Finally, the Go-Lab MOOC including a module devoted to online labs provided by FTP will be offered for free at the OpenCourseWorld-platform (hostet by IMC) for at least one year after the project finish.

3.2.18 The Institute of Accelerating Systems and Applications, IASA

Core business of the partner

The Institute of Accelerating Systems and Applications (IASA) was founded in 1994 in order to promote research and postgraduate studies in the Greek University system. It is affiliated with six university departments: Medicine, Physics and Informatics of the University of Athens and Electrical & Computer Engineering, Chemical Engineering and General Science of the National Technical University of Athens. IASA also has a number of support divisions, ranging from computing and electronics to medical physics, which support and enhance the capabilities of the individual research areas. IASA's IT division is particularly strong, since the Grid Operations Center in IASA is one of the major stakeholders of the Greek National Grid Initiative (HellasGrid) and it maintains one of the official HellasGrid clusters (HG-02-IASA). Furthermore, in the EGI era, IASA is acting as the task leader for the User Community Technical Services offered by the EGI-InSPIRE project.

The IASA outreach team has coordinated two European projects (Learning with ATLAS at CERN and Discover the COSMOS), having, among other tasks, the responsibility for the Discover the COSMOS portal where 626 structured lesson plans and 92,700 educational objects are hosted and can be found in an easily searchable way by the teachers. The team offers access to scientific data from the ATLAS detector as well as to a series of interactive applications (e.g. HYPATIA) that are integrated in the classroom practice.

Planned and achieved exploitable results

IASA's outreach team members are the authors of one of the two main tools used in the analysis of real data from the ATLAS experiment, HYPATIA, and will be constantly updating and improving it during the lifetime of the Go-Lab project. This HYPATIA application which provides four educational scenarios (ILSs) has already been integrated in the Go-Lab Portal during its first phase of development. During the second phase more ILS's based on CERNland and LHC Game will be developed.

In addition, IASA has conducted several Masterclasses at CERN, University of Athens and University of Crete during the IPPOG International masterclass activities in March 2013 and 2014. Also, together with EA and CERN, IASA initiated the e-masterclass and mini-masterclass activities, which are smaller scale masterclasses where the students can stay in their own school (or go to CERN), get an introduction to particle physics by researchers and are guided remotely (by video-conferencing) or by a few visiting scientists (and with the simultaneous help from their

trained teachers) to perform interactive analysis of real events from the LHC. A few schools can be connected at the end of the day to discuss their results as well. Usually, these masterclasses are accompanied by a "virtual visit" to the ATLAS control room, the center where the data are taken, and a long discussion between researchers and students. During the first two years of the Go-Lab project, tens of such events took place all over Greece (Komotini, Chalkida, Argos, Katerini, etc.), abroad (Ireland, Lithuania) as well as at CERN with students of different nationalities.

Finally, during the "Accelerating Science" CERN exhibition in May 2014 which had a record of 11,200 visitors out of which 4,200 were students, the IASA outreach team trained about 100 teachers in hands-on workshops.

Addressed target groups and their benefits

IASA's exploitation activities concentrate on the following target groups:

- Students are introduced to the cutting-edge technology during the masterclass activities (see above).
- Teachers participate in the special training sessions, where they learn the hand-on use of the ATLAS event analysis tools and receive training in the use of Go-Lab ILSs.
- General public can visit exhibitions organized by IASA and other Greek partners, as well as special lectures.

Exploitation and own use planning

The International Masterclasses, mini-masterclasses, e-Masterclasses and Virtual Visits will continue to take place through the organization of visits to schools during the lifetime of the Go-Lab project. More ILS's will be created by the IASA team and integrated to the Go-Lab Federation of online labs.

After the project had ended, the current plans are to:

- Maintain, enrich and update HYPATIA and the relevant ILSs created by IASA
- Use HYPATIA and ILSs in other research/outreach projects for Horizon 2020
- Use Go-Lab methodology and teacher support materials through the continuous organization of e-masterclasses in schools and universities

Promote the Go-Lab Portal through the use of scenarios directly connected to the school curriculum.

3.2.19 Núcleo Interactivo de Astronomia, NUCLIO

Core business of the partner

NUCLIO- Núcleo Interativo de Astronomia is a non-profit organization based in Portugal. Its main field of intervention is science education and outreach with special focus to Astronomy and its multidisciplinarity. Since 2009 NUCLIO is coordinating the Galileo Teacher Training Program, a legacy of the International Year of Astronomy. The program successfully named representatives in over 100 nations and reached over 20,000 teachers in training events worldwide. Empowering teachers on the use of cutting edge tools and resources for science education is the highlight of the institution activities.

Planned and achieved exploitable results

NUCLIO has successfully accredited a training course for teachers on the use of the Go-Lab tools and resources. Teachers enrolled in the course get 1 ECTS that contributes for their career progression.

NUCLIO promoted a tour around many of the Go-Lab pilot schools in order to establish an action plan for the next school year (September 2014 to August 2014). The design for the involvement of the teachers will be in several fronts: training the pilot teachers, implementing demo activities in their schools and supporting the continuation of the effort. This strategy will create a strong group of Go-Lab users and spread the use of the Go-Lab Repository.

The next natural step will be to engage other teachers in the same schools, from the same and/or different subject areas and grade levels in a cascade effect. This model is successfully being implemented in the framework of other projects NUCLIO is involved in and proves to be very strong and sustainable. The pilot teachers will eventually become Galileo Ambassadors (empowered to train other teachers) perpetuating the training cascade effect. Go-Lab MOOCs and continuation of training around more complex ILS will be the future strategy once a good network of Go-Lab ambassadors is spread across the country.

Addressed target groups and their benefits

Our core target audience is school teachers and in some cases we work directly with students. The general public will be involved in some activities for the sole purpose of providing support to the teachers actively engaged in the Go-Lab efforts. The foreseen general audience is composed by parents and other relatives of students from the school participating in the program. All participating schools that successfully implement Go-Lab in classroom environment will receive a certificate endorsed by the Ministry of Education. A protocol with the Ministries was established precisely with this purpose.

Exploitation and own use planning

We intend to use the ILSs as a tool to engage teachers in the use of several astronomical data and enroll students in real research experiences. Evaluation of this whole process will help us understand if this is a good strategy to sparkle students' interest for science, to validate their problem solving competences improvement and their engagement in possible future science careers. We are also very interested in mapping the possible use of Go-Lab tools and resources in the framework of the Portuguese curricula and documenting its impact.

4 Summary and Outlook

In the second project year, the work of the WP9 focused on dissemination of the project pilot activities, promotion of the Go-Lab Repository and newly developed features, establishing contact to external online lab providers aiming to integrate their labs into the Go-Lab Portal, and collaboration with Ministries of Education in pilot countries.

Multiple events were organised to address teacher and researcher communities. The Go-Lab project was promoted in 22 countries targeting both representatives from European communities and stakeholders around the world. In sum, 54 presentations were given, 40 workshops and hands-on activities were organised, 18 events in cooperation with other projects were conducted. By means of these activities a total number of about 5,731 stakeholders was reached. In addition, about 15,000 stakeholders were addressed with the project booths. 16 scientific publications were published in conference proceedings, scientific journals and books.

Go-Lab online community significantly increased its number of members counting 874 people (including newsletter recipients and social media group members and followers). In order to increase interactivity of the online community, Go-Lab organised Mini Video Contest involving project's stakeholder in the project promotion. Furthermore, Go-Lab was promoted in external online portals and newsletters of other organisations. In order to support project dissemination and implementation, Go-Lab Smart Show with subtitles in seven languages and several demo-videos were created; creation of the Go-Lab MOOC for teachers had started.

Go-Lab attracted several online lab providers, who contributed their labs to the Go-Lab Portal (e.g., PhET interactive simulations, EUMETSAT, Virtual Biology Lab Project, Inquiry-to-Insight Project, and Virtual Labs project). Further, Go-Lab established cooperation with weSPOT project using Go-Lab online labs in their infrastructure and STEMfinity listing Golabz Repository in their portal for free STEM educational resources. Moreover, Ministries of Education in Greece and Basque Country committed to support Go-Lab implementation; establishment of cooperation with MoEs in the Netherlands, Belgium, and Switzerland is in progress.

In the third project year, Go-Lab will continue disseminating the pilot activities and the Go-Lab Portal using online and offline dissemination channels. Outcomes of the pilot activities like user experience reports, best practices and teachers' ILSs will be used to provide "first-hand" impressions to the potential users. Videos of the workshops and interviews with the teachers will be provided. New interactive activities for the online community (like Mini Video Contest) will be designed and organised. Furthermore, Go-Lab will offer the MOOC for teachers supporting them in integrating Go-Lab in their teaching practices.

Go-Lab will keep attracting new online labs providers in order to enrich the Go-Lab Portal with external online labs and inquiry learning tools. Also, online portal providers will be addressed in order to explore the possibilities for integration of Go-Lab online labs and tools into external infrastructures. First acceptance and feasibility studies concerning additional paid services (like availability of commercial labs in the Repository, paid tutoring and certification services on the Bartering (Tutoring) and MOOC platforms, and paid training services) will be conducted.

The work with Ministries of Education will continue in order to assure mainstreaming of Go-Lab and its implementation by schools in different countries.

Annex: Overview of dissemination activities (Year 2)

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
PRESENTATIONS, KEY NOTES, INVITED TALKS				
Presentation of the Go-Lab project at the Future Jobs Event at CUAS	03.04.2014	Austria	170	
Go-Lab presentation during IPN 2015 Youth employability - partnership solutions	10.09.2014	Belgium	15	http://www.iebpn.net/wp-content/uploads/2014/03/IPN-2014-Programme.pdf
Presentation of a poster on Go-Lab in ACM Conference on Human Factors in Computing Systems (Human Factors (CHI) 2014	30.04.2014	Canada	150	http://chi2014.acm.org/program/
Presentation of the paper named "Enforcing Privacy for Teenagers in Online Inquiry Learning Spaces" at CHI Conference on Human Factors in Computing Systems 2014	26.04.2014-01.05.2014	Canada	50	http://chi2014.acm.org/
Keynote: Inquiry Learning Spaces and Online Labs for STEM Education at School and in MOOCs, The International Conference on Engineering Education and Research	25.08.2014	Canada	80	http://www.iceer2014.com
Invited Talk: Inquiry Learning Spaces and Online Labs for STEM Education at School, McMaster University	26.08.2014	Canada	15	
Opening Speech: Business Opportunities for Mobile Applications in Online Education and Agile Knowledge Management, Forum on Software Trade	23.10.2014	China	300	http://en.globalitoutsourcing.org.cn/en/exhibition1.asp?sid=214
Go-Lab Project introduction to physics teachers during the summer school near Tartu	13.06.2014	Estonia	*15*	-

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Go-Lab Project introduction to master students teachers at Tartu University	23.09.2014	Estonia	*10*	-
Presentation of the Go-Lab paper at ICWL 2014 conference	16.08.2014	Estonia	60	http://icwl2014.tlu.ee/
Go-Lab presentation at teachers' vocational training (MINT-Tag NRW)	20.11.2013	Germany	50	http://www.kt.e.nrw.de
Go-Lab presentation and demonstration for the MAth-GeAr Project	12.09.2014	Germany	30	
Presentation for Saarpfalz-Gymnasium	10.12.2013	Germany	5	
Go-Lab presentation at teachers' round table (local teacher meeting of informatics teachers)	14.05.2014	Germany	14	
Presentation of a Go-Lab paper entitled "A Responsive Design Approach for Supporting Mobile Access to Virtual and Remote Laboratories" at the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014)	07.07.2014-09.07.2014	Greece	50	http://www.ask4research.info/icalt/2014/node/42
Presentation of a Go-Lab paper entitled "A Method for Developing Mobile Virtual Laboratories (BEST SHORT PAPER AWARD)" at the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014)	07.07.2014-09.07.2014	Greece	50	http://www.ask4research.info/icalt/2014/node/42
Invited Talk: Go-Lab: Global Online Science Labs for Inquiry Learning at School, The 11th Educational Repositories Network (EdReNe) Conference	06.05.2014	Greece	25	http://wiki.agroknow.gr/agroknow/index.php/11th_EdReNe_Conference
Public talk at Argos	February 2014	Greece	50	
Invited talk at ICNFP 2014	July 2014	Greece	80	http://indico.cern.ch/event/277650/page/0
Presentation of Go-lab to Greek teachers of Innovative Experimental High schools	July 2014	Greece	80	

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Go-lab presented during ICALT 2014	09.06.2014	Greece	30	http://www.ask4research.info/icalt/2014/
Presentation of the Go-Lab paper at ICALT 2014 con-ference	07.07.2014	Greece	50	http://www.ask4research.info/icalt/2014/
Open day at Chania, Crete (physics experiments for ages 9-99)	August 2014	Greece	200	
Go-Lab presentation at IT in Education Seminar in HKU Faculty of Education	20.06.2014	Hongkong	30	http://www.cite.hku.hk/news.php?id=520&category=seminar
Go-Lab Presentation at GLORIA Project Meeting	15.05.2014	Italy	40	http://events.iasfbo.inaf.it/gloria/od_programme.php
Keynote: Services for Inquiry Learning with Online Labs, 5th International Conference on Next Generation Net-works & Services	29.05.2014	Morocco	80	http://www.e-ngn.org/ngns14/keynotes.html
Inquiry learning & Go-Lab (presentation at Conference on Informatics & ICT)	23.11.2013	Netherlands	10	http://ieni.org/conferentie-2013/programma-2013/1600-2/
Inquiry learning & Go-Lab (presentation at the SamSam conference)	20.05.2014	Netherlands	12	http://samsamcongres.nl/nieuws/onderzoekend-leren-met-go-lab.aspx
Go-lab presentation at the REV conference 2014	28.02.2014	Portugal	10	http://www.rev-conference.org/REV2014/
Go-Lab Presentation at FASCINIO 2013 - Festa de As-tronomia e Ciência do NUCLIO	14.12.2013-15.12.2013	Portugal	50	https://www.facebook.com/media/set/?set=a.790774670939549.1073741853.130639500286406&type=3
Go-lab presentation in teacher training in Madeira Island	07.01.2014-14.01.2014	Portugal	20	https://www.facebook.com/media/set/?set=a.796217353728614.1073741854.130639500286406&type=3
Go-lab presentation during a training workshop in Caldas da Rainha	21.03.2014	Portugal	20	https://www.facebook.com/media/set/?set=a.881967808486901.1073741870.130639500286406&type=3
Go-lab presented during Astro-coruche 2014	24.05.2014	Portugal	20	http://www.atalaia.org/2014/05/26/astrocoruche-2014/
Go-lab presented during SciCom 2014	03.06.2014	Portugal	40	http://scicom.up.pt/program/
Go-lab presented during Hands-on Science 2014	21.07.2014-25.07.2014	Portugal	30	http://www.hsci2014.info/generalinformation.html

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Go-lab presented during Astronomy Education Alliance Meeting / EPSC 2014	08.09.2014-12.09.2014	Portugal	100	http://www.europlanet-eu.org/media-centre/86-epsc/epsc-2014/epsc-2014-press-releases/648-epsc2014-in-cascais-portugal
Go-lab presentation during Festa das Estrelas	03.05.2014	Portugal	100	https://www.facebook.com/media/set/?set=a.861911537159195.1073741867.130639500286406&type=3
Presentation of a Go-Lab paper entitled "ASK4LABS: A Web-based Repository for Supporting Learning Design Driven Remote and Virtual Labs Recommendations" at IADIS 11th International Conference on Cognition and Exloratory Learning in Digital Age (CELDA2014)	25.10.2014-27.10.2014	Portugal	150	http://www.celda-conf.org/
Go-lab presentation during Sonette Meeting	16.01.2014	Portugal	20	
Go-lab presentation during ECO-Schools Portugal Meeting	24.01.2014	Portugal	400	http://www.eco-schools.org/
Go-lab presentation during COSPAR 2014	02.08.2014-06.08.2014	Russia	31	http://go-lab-project.eu/news/go-lab-40th-cospar-scientific-assembly-moscow
Project presentation for school teachers at Udeusto	18.02.2014	Spain	20	
Talk at education parellel session of ICHEP 2014	July 2014	Spain	50	https://indico.ific.uv.es/indico/conferenceProgram.py?confId=2025
Presentation of the Go-Lab project at NeReLa study visit to the University of Deusto in Bilbao	10.06.2014	Spain	20	http://nerela.etf.rs/component/content/?view=featured&start=10
Including online labs in science education classrooms: theory, evidence, and the Go-Lab technological affordances (keynote at XII TAEE conference)	11.06.2014	Spain	75	http://www.taee2014.es/index.php/en/keynotes-en#dejong
Presentation of the paper "GOLABZ: Towards a federation of online labs for inquiry-based science education at school" at the EDULEARN 2014 conference	08.07.2014	Spain	50	http://iated.org/edulearn/announcement
Go-lab presenation at the ATLAS outreach meeting	February 2014	Switzerland	50	

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Go-lab presenation at the ATLAS outreach meeting	October 2014	Switzerland	50	
Presentation for Swisscom (provider of the Mindsteps platform for schools)	04.04.2014	Switzerland	5	https://www.mindsteps.ch
Learning in online science laboratories: how to create well-structured and scaffolded learning experiences. Keynote at iSER (The International Society of Educational Research) 2014 World Conference	31.10.2014	Turkey	n.n	https://asera.org.au/wp-content/uploads/2013/06/iSER-2014-Flyer.pdf
Presentation of the paper named "AngeLA: Putting the teacher in control of privacy in the classroom" at ITHET Conference 2014	11.09.2014-13.09.2014	United Kingdom	50	http://www.york.ac.uk/conferences/ithet2014/
Presentation at Mobile Space (Apps for Astronomy), Liberty Stadium, Swansea	14.05.2014	United Kingdom	60	http://www.liberty-stadium.com/events_venue_events_view.php?id=53
Presentation at Science and the Assembly, Cardiff	20.05.2014	United Kingdom	200	http://www.rsc.org/ConferencesAndEvents/RSCConferences/science_and_the_assembly_2014/
Presentation at ESERO Meeting	01.06.2014	United Kingdom	50	http://www.esero.org.uk/news/esero-uk-space-conference---the-primary-frontier
Presentation at National Astronomy Meeting, Portsmouth	23.06.2014	United Kingdom	30	http://www.nam2014.org/
WORKSHOPS, DEMONSTRATIONS, TRAININGS				
Introductory presentation to Go-Lab to 12 Italian final year students	03.06.2014	Belgium	12	
Organisation of a Go-Lab workshop, introduction session	January 2014	Estonia	25	-
Organisation of a Go-Lab workshop, introduction session	February 2014	Estonia	75	-

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Organisation of a Go-Lab workshop, introduction session	March 2014	Estonia	75	-
Organisation of a Go-Lab workshop, introduction session	June 2014	Estonia	55	-
ICALT Track on Technology-Enhanced Science, Technology, Engineering and Math Education	07.07.2014-09.07.2014	Greece	50	http://www.ask4research.info/icalt/2014/
IPPOG masterclass at the University of Crete, Iraklio (including Go-Lab activities)	March 2014	Greece	155	http://www.inspiring-science-education.net/news/10th-edition-ippog-masterclasses-completed-iasa-trained-250-students-and-40-teachers
Four e-masterclasses in Greek schools in the Attica region (including Go-Lab activities)	Sept-Oct 2014	Greece	160	
IPPOG masterclass at the University of Athens (including Go-Lab activities)	March 2014	Greece	95	http://www.inspiring-science-education.net/news/international-ippog-masterclass-university-athens
Three practice workshops for teachers during the "Accelerating Science" exhibition of CERN at Evgenidio Foundation in Athens	May 2014	Greece	75	http://www.amna.gr/english/articleview.php?id=5857
Four e-masterclasses in several Greek schools (Katerini, Chalkida, Argos, Aigio) (including Go-Lab activities)	Nov 2013 - June 2014	Greece	190	
Go-Lab Workshop at JTEL Summer School	30.04.2014	Malta	20	http://www.prolearn-academy.org/Events/summer-school-2014
Go-Lab introduction and workshop for chemistry teachers in the Netherlands	09.09.2014	Netherlands	9	
Go-lab teacher training in Enschede	11.04.2014-15.04.2014	Netherlands	11	https://www.facebook.com/media/set/?set=a.878779498802807.1073741855.128063420541089&type=3
Go-Lab workshop: Inquiry Based STEM teaching with Online Labs	07.04.2014	Online	17	

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Go-Lab workshop: Inquiry Based STEM teaching with Online Labs	24.04.2014	Online	14	Link
Go-Lab: Introductory workshop for teachers	12.06.2014	Online	15	
Go-lab training in Vila Nova de Gaia	16.11.2013	Portugal	13	https://www.facebook.com/media/set/?set=a.881976475152701.1073741872.130639500286406&type=3
Go-Lab Training Escola Secundária Ferreira Dias, Lisbon, Portugal	21.11.2013	Portugal	18	https://www.facebook.com/media/set/?set=a.790674720949544.1073741851.130639500286406&type=3
Go-lab presentation in Lisbon - Escola Filipa Lencastre	12.05.2014	Portugal	5	
Go-lab presentation in EB 2/3 via Longa	12.05.2014	Portugal	7	
Go-lab presentation in Cascais - Ludotecas	22.05.2014	Portugal	10	
Go-lab presentation at Escola Secundária de Palmela	23.05.2014	Portugal	10	https://www.facebook.com/media/set/?set=a.889722831044732.1073741884.130639500286406&type=3
Go-lab presentation in Vila Verde	09.06.2014	Portugal	10	
Go-lab presentation in S.J.Madeira	09.06.2014	Portugal	10	
Go-lab presentation in Conservatório de Música	09.06.2014	Portugal	5	

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Go-lab presented in S-Miguel Island	16.09.2014-21.09.2014	Portugal	15	
Workshop at Instituto Superior Politécnico de S. Tomé e Príncipe	01.11.2013-08.11.2013	São Tomé and Prínci	20	
Go-Lab smart device & smart gateway meeting for online lab provider at UNED	04.06.2014-06.06.2014	Spain	15	
Demonstration of the Go-Lab project to partcipants of Greek Teachers Programme 1 at CERN	08.10.2014	Switzerland	38	https://indico.cern.ch/event/324194/
Demonstration of the Go-Lab project to partcipants of Greek Teachers Programme 2 at CERN	13.08.2014	Switzerland	38	https://indico.cern.ch/event/331514/
Demonstration of the Go-Lab project to Jordanian teach-ers programme and Kazakhsanian high school students	08.07.2014	Switzerland	32	
IPPOG masterclass at CERN with French students (in-cluding Go-Lab activities)	Aptil 2014	Switzerland	45	http://www.inspiring-science-education.net/news/10th-edition-ippog-masterclasses-completed-iasa-trained-250-students-and-40-teachers
Go-lab Workshop at the EDUCON 2014 Conference: Remote Experiment in Inquiry-Based Instruction	02.04.2014	Turkey	12	http://www.educon-conference.org/educon2014
EVENTS IN COOPERATION WITH OTHER PROJECTS				
Go-Lab presentation during "Global - excursion" closing event	15.02.2014	Belgium	32	
Go-Lab workshop Inquiry Based STEM teaching with Online Labs at the 4th Science Projects workshop at the Future Classroom Lab	24.05.2014	Belgium	24	http://blog.scientix.eu/2014/06/12/4th-science-project-workshop-in-the-future-classroom-lab-4th-spwfcl/
Go-Lab presentation during the 2nd Scientix Project's networking event	05.09.2014	Belgium	33	http://www.scientix.eu/web/guest/networking-event/2nd-spne

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Dissemination material at the Scientix teachers meeting	06.09.2014	Belgium	30	http://www.scientix.eu/web/guest/networking-event/2nd-spne
Go-Lab Presentation at SCIENTIX 2014 conference	25.10.2015	Belgium	450	http://www.scientix.eu/web/guest/conference
Go-Lab workshop during the inGenious summer school (1)	23.08.2014	Croatia	35	http://www.eun.org/news/detail?p_p_id=webcontentbrowser_WAR_eunbaseport-let_INSTANCE_7dwF&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&_webcontentbrowser_WAR_eunbaseportlet_INSTANCE_7dwF_action=view-de-tail&_webcontentbrowser_WAR_eunbaseportlet_INSTANCE_7dwF_groupId=43887&_webcontentbrowser_WAR_eunbaseportlet_INSTANCE_7dwF_articleId=2588410
Go-Lab workshop during the inGenious summer school (2)	23.08.2014	Croatia	30	http://www.eun.org/news/detail?p_p_id=webcontentbrowser_WAR_eunbaseport-let_INSTANCE_7dwF&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&_webcontentbrowser_WAR_eunbaseportlet_INSTANCE_7dwF_action=view-de-tail&_webcontentbrowser_WAR_eunbaseportlet_INSTANCE_7dwF_groupId=43887&_webcontentbrowser_WAR_eunbaseportlet_INSTANCE_7dwF_articleId=2588410
Guided inquiry with online labs – a participatory design experience: ICCE Workshop on Bali (Go-Lab and WeSPOT projects)	20.11.2013	Indonesia	30	http://www.go-lab-project.eu/workshop/icce-2013-interactive-event
Session on IBSE & Go-Lab at the ESA/GTTP teacher workshop entitled 'Inspiring science education'	25.11.2013	Netherlands	20	http://lorentzcenter.nl/lc/web/2013/596/program.php3?wsid=596&venue=Snellius

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Two sessions at the ESA/GTTP teacher workshop entitled 'The Go-lab project'	27.11.2013-28.11.2013	Netherlands	40	http://lorentzcenter.nl/lc/web/2013/596/participants.php3?wsid=596&venue=Snellius
Session at the ESA/GTTP teacher workshop entitled 'The Down2Earth impact simulator'	29.11.2013	Netherlands	20	http://lorentzcenter.nl/lc/web/2013/596/program.php3?wsid=596&venue=Snellius
Two sessions at the ESA/GTTP Summer Workshop for teachers entitled 'Down2Earth - from deep space to deep impact'	23.07.2014	Netherlands	40	http://congrexprojects.com/2014-events/14c20/introduction and http://www.esa.int/Education/Teachers_Corner/ESA_s_Summer_workshop_for_teachers_brings_space_into_the_classroom_once_again
Go-Lab presentation at the ESA/GTTP training	26.11.2013	Netherlands	29	https://www.facebook.com/media/set/?set=a.765736973440394.1073741852.128063420541089&type=3
Round Table at the REV conference 2014	28.02.2014	Portugal	40	http://www.rev-conference.org/REV2014/
Go-lab training at GTTP International teacher event	01.09.2014-05.09.2014	Portugal	20	
Brochures disseminated at 3rd inGenious Academy for Heads of Schools	06.03.2014	Sweden	80	http://www.eun.org/events/detail;jsessionid=6E9B0DA8095D205CC76561EFAEA59707?p_p_id=EventDetailsPortlet_WAR_eventcalendarportlet_INSTANCE_5diF&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&_EventDetailsPortlet_WAR_eventcalendarportlet_INSTANCE_5diF_eventId=1862
PROJECT BOOTH				

Activity	Date(s)	Country	Nr. of parti-cipants	Link (if available)
Dissemination material distributed at the 48th EPCA annual meeting, 4-8 October 2014	04.10.2014-08.10.2014	Austria	2.000	https://epca.eu/annual-meeting-workshop/48th-Annual-Meeting-Vienna
Go-Lab booth and demonstration at the SCIENTIX 2014 conference	24.10.2014-26.10.2014	Belgium	600	http://www.scientix.eu/web/guest/conference
Go-Lab booth and demonstration at ICWL 2014 conference	14.08.2014-17.08.2014	Estonia	50	http://icwl2014.tlu.ee/
Go-Lab booth at Euro-Space-Day Saarbrücken	22.10.2014	Germany	50	http://www.regionalverband-saarbrueck-en.de/form/index.php?menuid=684&topmenu=18&keepmenu=inactive
Leaflets distribution at the 14th IEEE International Conference on Advanced Learning Technologies (ICALT 2014)	07.07.2014-09.07.2014	Greece	250	http://www.ask4research.info/icalt/2014/
Project presentation in Vilnius, Lithuania at the ICT 2013 exhibition	06.11.2013-08.11.2013	Lithuania	5.315	http://ec.europa.eu/digital-agenda/events/cf/ict2013/item-display.cfm?id=11248
Go-Lab booth at the TAEE conference 2014	11.06.2014-13.06.2014	Spain	100	http://www.taee2014.es/index.php/en/
Go-Lab booth at VI Jornada Universitaria de Innovación y Calidad (Conference)	03.07.2014	Spain	150	
Go-Lab booth at Stargazing Live Events, UK	11.01.2014-22.01.2014	United Kingdom	3.500	http://www.bbc.co.uk/programmes/b019h4g8
Go-Lab booth at National Astronomy Week, Cardiff Museum, UK	08.03.2014	United Kingdom	2.000	http://www.astronomyweek.org.uk/
Go-Lab booth at Royal Society Summer Exhibition, London, UK	29.06.2014-06.07.2014	United Kingdom	1.000	https://royalsociety.org/summer-science/