Go-Lab

Global Online Science Labs for Inquiry Learning at School

Collaborative Project in European Union's Seventh Framework Programme

Grant Agreement no. 317601

Deliverable D9.4

Report of Dissemination and Exploitation Activities (Year 3)

Editor	Diana Dikke (IMC)
Date	30 October 2015
Dissemination Level	Public
Status	Final

The Go-Lab Consortium

Beneficiary Number	Beneficiary name	Beneficiary short name	Country
1	University Twente	UT	The Netherlands
2	Ellinogermaniki Agogi Scholi Panagea Savva AE	EA	Greece
3	École Polytechnique Fédérale de Lausanne	EPFL	Switzerland
4	EUN Partnership AISBL	EUN	Belgium
5	IMC AG	IMC	Germany
6	Reseau Menon E.E.I.G.	MENON	Belgium
7	Universidad Nacional de Educación a Distancia	UNED	Spain
8	University of Leicester	ULEIC	United Kingdom
9	University of Cyprus	UCY	Cyprus
10	Universität Duisburg-Essen	UDE	Germany
11	Centre for Research and Technology Hellas	CERTH	Greece
12	Universidad de la Iglesia de Deusto	UDEUSTO	Spain
13	Fachhochschule Kärnten – Gemeinnützige Privatstiftung	CUAS	Austria
14	Tartu Ulikool	UTE	Estonia
15	European Organization for Nuclear Research	CERN	Switzerland
16	European Space Agency	ESA	France
17	University of South Wales	USW	United Kingdom
18	Institute of Accelerating Systems and Applications	IASA	Greece
19	Núcleo Interactivo de Astronomia	NUCLIO	Portugal
20	Cardiff University	CU	United Kingdom

Contributors

Name	Institution
Diana Dikke	IMC
Lena Fleckinger	IMC
Nils Faltin	IMC
Yiwei Cao	IMC
Ton de Jong	UT
Henny Leemkuil	UT
Sofoklis Sotiriou	EA
Georgios Mavromanolakis	EA
Eleftheria Tsourlidaki	EA
Denis Gillet	EPFL
Evita Tasiopoulou	EUN
Teodora Ioan	EUN
Effie Law	ULEIC
Zacharias Zacharia	UCY
Nikoletta Xenofontos	UCY
Sven Manske	UDE
Kristina Angenendt	UDE
Miguel Rodriguez Artacho	UNED
Panagiotis Zervas	CERTH
Olga Dziabenko	UDEUSTO
Javier Garcia-Zubia	UDEUSTO
Amir Mujkanovic	CUAS
Mario Mäeots	UTE
Margus Pedaste	UTE
Urmas Heinaste	UTE
Barbora Gulejova	CERN
Fraser Lewis	USW
Christine Kourkoumelis	IASA
Rosa Doran	NUCLIO
Joanna Holt	ESA
Rob Edlin-White (peer-review)	ULEIC
Lars Bollen (peer-review)	UT

Legal Notices

Executive Summary

In the Go-Lab project, WP9 “Dissemination and Exploitation” aims at promoting the project and its results among different groups of stakeholders (teachers, teacher trainers, researchers, Ministries of Education, online lab owners, general public, etc.) in order to support the dissemination and implementation of the 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 related projects and communities, creates supportive materials for teachers (including an online course), collaborates with political stakeholders and standardization bodies, and seeks funding to be available after the project end.

In the Year 3, WP9 actively used online dissemination channels of the project and cooperation partners (like Facebook and Twitter channels of Scientix and eTwinning projects, newsletters of the consortium members, relevant online portals, etc.). 811 members joined Go-Lab online community (Facebook: 321 members, Google+: 30, LinkedIn: 13, Twitter: 304, YouTube: 32, SlideShare: 5, Flickr: 1, Newsletter: 105) [1]. The project website was visited by 26,722 users[2]. The number of offline dissemination activities increased compared to the Year 2. Thus, 101 presentations of the project reaching 5,286 participants were given, 54 workshops and events involving 1,052 participants were organized by the project, plus 21 joint events reaching 1,164 participants were organized in cooperation with other communities and consortia.

Regarding the exploitation activities, in the Year 3 Go-Lab created a detailed business model for the project’s sustainability and exploitation (documented in Section 3). WP9 worked together with WP6 building a sustainable online teacher community based in the Go-Lab Tutoring Platform. Furthermore, Go-Lab collaborated with the Ministries of Education in Greece, Portugal, Spain, Bulgaria, Austria, and Estonia. In addition, a new project using and further developing Go-Lab technology and approach received funding in the Netherlands. Further project proposals will be submitted to IMAILE, Fast Track to Innovation Pilot, and Horizon2020 calls. Finally, Go-Lab continued working on standardization together with the FORGE project and IEEE Working Group P18761 on Networked Smart Learning Objects for Online Laboratories.

[1] As of 19th October 2015. All numbers excluding project members
[2] As of 30th September 2015.

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 the WP9 in the third project year addressed the tasks T9.2, T9.3, and T9.4 conducting online and offline dissemination activities, establishing contact and organizing joint activities together with related projects, organizations, and communities, as well as preparing technology standardization. Importantly, in scope of the exploitation planning a detailed business model was created in an iterative process, being commented, adapted and approved by the project partners. In the Year 4, different aspects of this model (e.g., introduction of paid online labs and tools, expert tutoring services, and the Go-Lab Academy as a main provider for teacher training) will be verified through user surveys and small pilot studies (task T9.5). Finally, Go-Lab started creation of user guides and supportive materials, which will be continued in the Year 4, and summarized and documented in the recommendations for the introduction of online labs in schools (task T9.6).

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 2.3). Section 2.4 evaluates Key Performance Indicators and defines directions for future actions. Go-Lab MOOC (content development progress and release preparation) is described in Section 2.5. The second part of the Deliverable (Section 3) represents the sustainability and exploitation plan of the Go-Lab project (in form of a Business Model Canvas and detailed explanations to its each part) and the report on exploitation actions taken in the Year 3. In the 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 third 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) and offline activities (like organization of workshops and events, presentations for teachers and other target groups, publishing scientific papers and participation in conferences, organization of joint events together with other projects, and so on). Also, correspondence of taken actions to the initial dissemination strategy (defined in Year 1) and 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 inventories (scientific organizations and universities) are available; Go-Lab Portal (pilot and initial versions) is released;	Dissemination of the project results via online channels; support of the workshops and implementation activities (e.g., dissemination materials, announcements); press release; creation of an official project video or a smart show; creation of workshop videos to be made	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-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

Project activities and Results	Dissemination activities	Realization status
evaluation and validation "dashboard" tool is available. Implementation Phase A is running; Practice Reflection Workshops in 10 countries are conducted.	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.	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.	Go-Lab online community increased the number of its members by 811 users; online channels are actively used (768 posts by Go-Lab and 978 actions by users)[3]; 36 scientific publications; 176 offline dissemination events reaching 7,502 participants. Go-Lab Tutoring Platform promoted through various channels; four webinars conducted in cooperation with WP6; one tutoring session organized by teacher. Teacher support page created in cooperation with WP6 and WP7. Several videos about the use of Go-Lab created by teachers available on YouTube.
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 third project year correspond to the defined plan and provide a good basis for the fourth 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.

[3] See section 2.4 (KPI 1.3, 1.4, and 1.5)

2.2 Online Dissemination Activities

The Go-Lab Project uses its own internal and external online dissemination channels to promote the project and to attract stakeholders to active participation in its activities. Go-Lab takes a pro-active 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 stake-holders. Further, Go-Lab establishes cooperation with related projects and initiatives to address mutual target groups via online communication channels. This section describes updates in the projects' dissemination channels (compared to M24 documented in D9.3) and provides an over-view of online activities taken in the Year 3 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 pro-ject, 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. In the Year 3, 27 articles were published (thus, the blog currently contains 71 articles in total)[4].

In the time period between M25 and M36 (Year 3) the following updates to the website have been implemented[5]:

- The content of the Homepage (www.go-lab-project.eu) was updated. Now, the three tabs of the "accordion"-content represent the three parts of the Go-Lab Portal: the Online Lab Repository (www.golabz.eu), the ILS Authoring Platform (graasp.eu), and the Tutoring Platform (tutoring.golabz.eu), so the users can directly get an overview of the Go-Lab offer and proceed to the Go-Lab Portal (see Figure 1).
- Under the "Go-Lab Portal" main menu, a new tab "Tutoring Platform" (http://www.go-lab-project.eu/tutoring-platform) was created explaining the platform and its functionalities.
- Under the "Teachers" main menu, a new tab "Online Course" (http://www.go-lab-project.eu/mooc) was added, representing the upcoming online course (MOOC) for science teachers and providing an overview of the learning modules.
- Finally, all texts represented on the website (especially those containing information about the Call for Pilot Schools, http://go-lab-project.eu/call-for-schools) were revised and up-dated, if it was needed. The list of external partners (http://www.go-lab-project.eu/external-partner) was extended.

[4] As of 19th October 2015

[5] A detailed description of the Go-Lab website including the description of the website structure and navi-gation, main content types, as well as Content Management System is provided in the deliverable "D9.1 - Project Website and Dissemination Materials" (M6). Deliverable D9.3 "Report on Dissemination and Exploi-tation Activities" (M24) gives an overview of the website status by the end of Year 2.

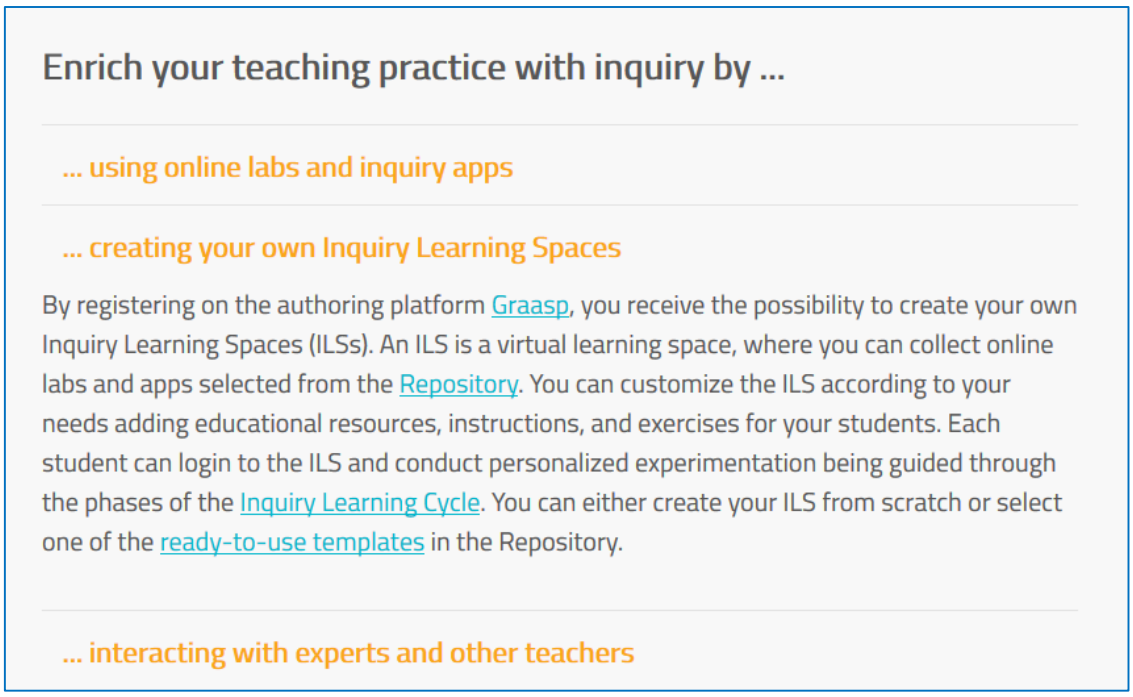

Figure 1: Updated "accordion"-content at the homepage (Go-Lab website)

In the period from the 1st November 2014 to the 30th September 2015, the project website was visited by 26,722 unique visitors[6] (according to the DoW, at least 5,000 unique visitors in the third project year were planned). Compared to the previous year, the number of unique visitors has grown (compare to 20,358 unique visitors in the Year 2).

The website visitors come from the United States (17%), Spain (9%), United Kingdom (8%), Greece (5%), Portugal (5%), Italy (5%), Germany (4%), India (4%), Romania (3%), the Netherlands (3%), Estonia (2%), Croatia (2%), Turkey (2%), Belgium (2%), Cyprus (2%), Brazil (2%) and other countries (see Figure 2).

72% of visitors are new, and 28% are returning visitors.

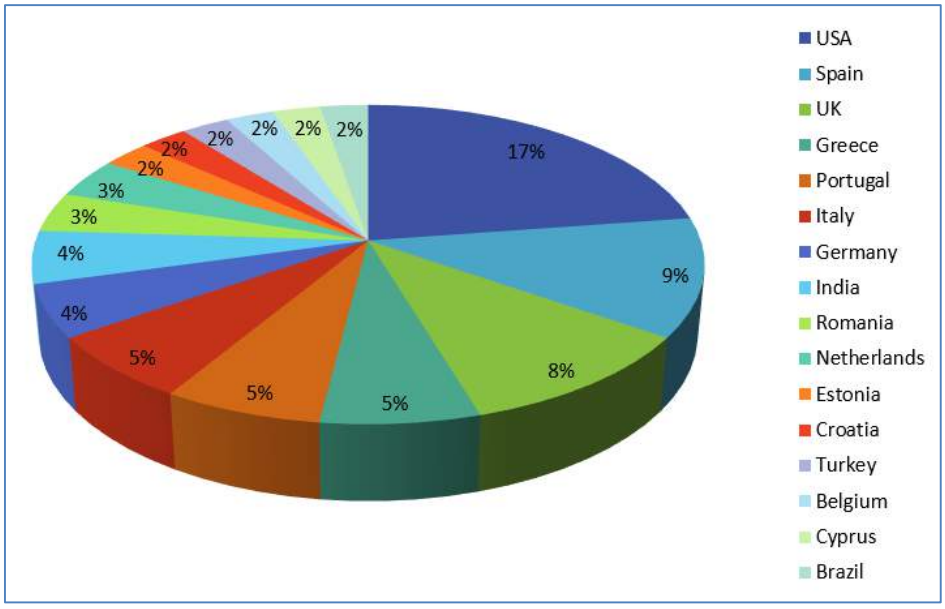

Figure 2: Go-Lab website unique visitors by country (Year 3)

[6] Website developers from IMC are excluded from the statistics.

The percentage of the website visitors from the USA has further increased by five percent in the Year 3. This is related to the integration of the online labs to the Go-Lab Repository, which are provided by the online lab owners from the USA (for example, PhET Interactive Simulations, Concord Consortium, East Tennessee State University, etc.)[7]. The percentage of unique visitors from other countries included in this statistics slightly decreased (by 1 to 5 percent), during the countries not represented here (due to very small percentage, less than 1.5%) increased their total percentage from 16% in the Year 2 to 23% in the Year 3. This change in the percentage distribution shows that Go-Lab spread among countries in the "long tail".

Figure 3 demonstrates the distribution of the website sessions in different countries in the Year 1, Year 2, and Year 3, representing structural changes described above. (The graphic considers only those countries contributing 1.5 or more percent of the website sessions).

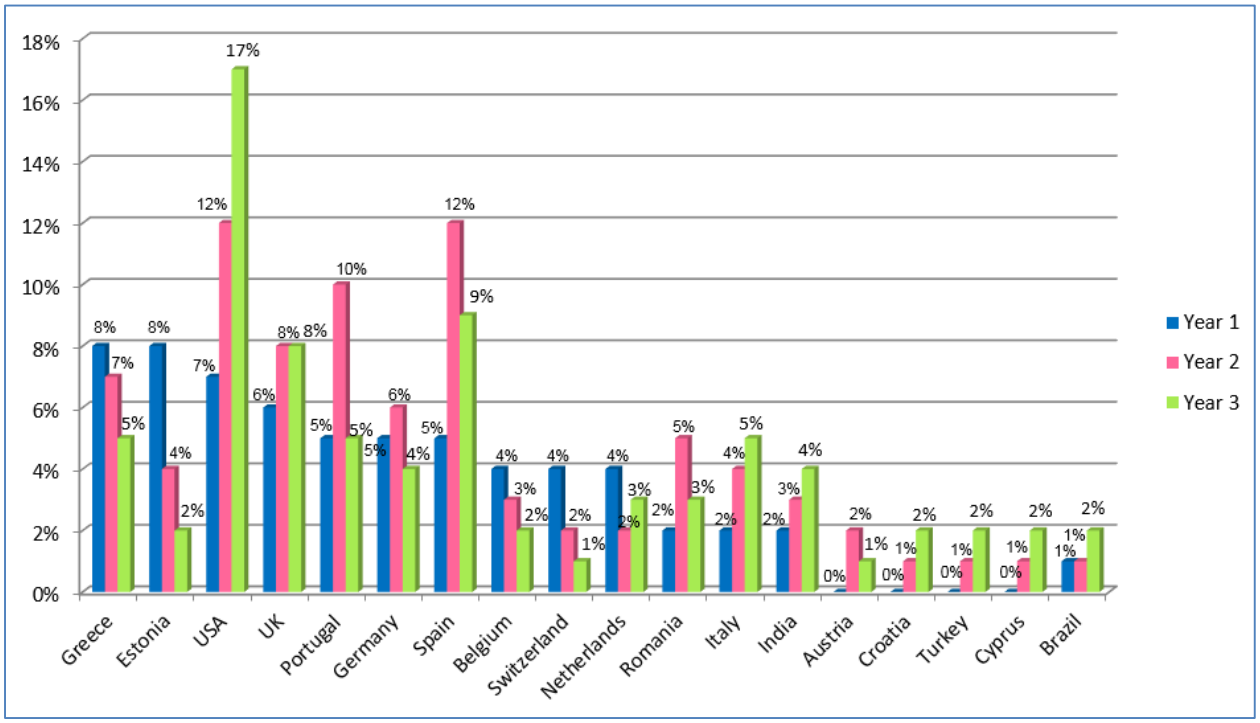

Figure 3: Website session distribution by country in Year 1, Year 2 and Year 3

Figure 4 (on the next page) represents the number of unique visitors who accessed the website in the third project year (01.11.2014-30.09.2015) as well as the number of new sessions. The website visits as well as the estimated percentage of the first time visits (% New Sessions) are uniformly distributed over the time period with about 110-140 visits a day (the lowest points of the curve represent weekends with about 40-50 visits a day), which confirms continuity of project dissemination, community building and implementation activities conducted by all consortium members.

Towards the mid and end of January, the project website was accessed by 140-160 users a day. Most probably, this activity increase was caused by the publication of the Call for Schools (Pilot Phase B). At the end of March (21.03-26.03.2015) the number of visitors per day was about 160-190 users, which can be explained by the projects' presence at the EDUCON, NPSE, and Scientix conferences, as well as implementation activities in different countries.

The highest activity (more than 200 users a day) was registered in the second part of June and in July (with the highest peak of 387 users a day on July 14th) after the publication of the Call for

[7] However, it has to be considered that multiple visits could be caused by web robots (short visit duration). An exact number is unknown.

Schools (Pilot Phase C) and before and during the Go-Lab Summer School. Several events like Go-Lab workshops at the JTEL Summer School, Go-Lab presentations at Scientix and EDU-LEARN conferences, as well as at the workshop of the Greek Physics Union, took place during this time period.

After a period of lower user activity in August, it increased again at the beginning of September, most probably with the beginning of the school year (and partly due to Go-Lab events at the ESERA, Scientix, EC-TEL and EDEN conferences).

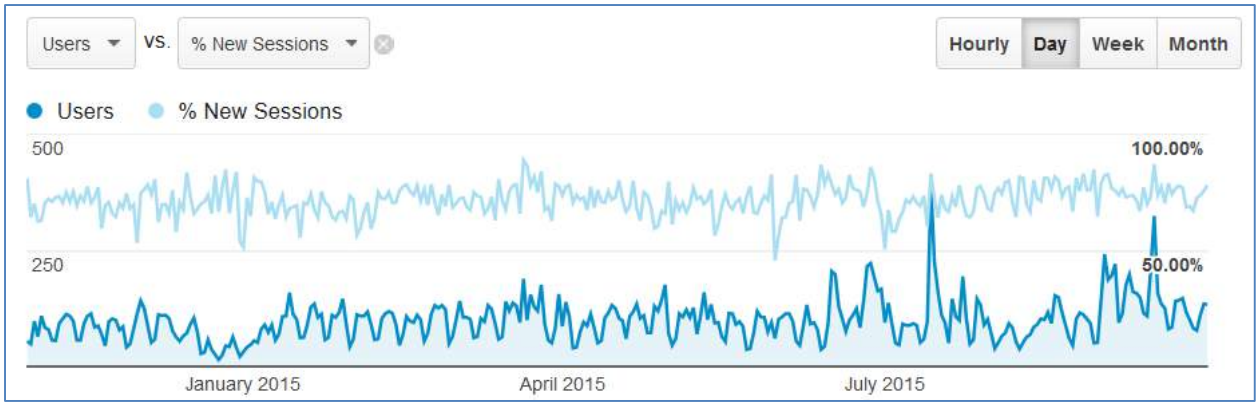

Figure 4: Unique visitors of the Go-Lab website (Year 3)

The traffic sources are represented as follows:

- 54% organic search (compare to 40% in the Year 2; users searching for “go lab”, “virtual science labs”, “golab”, “go-lab”, and so on),
- 21% referral traffic (users are redirected from other websites, e.g., www.golabz.eu, https://eun.org, https://golab.ea.gr, https://esa.int, https://etwinning.net),
- 17% direct traffic (users clicking direct links to sub-pages, e.g., provided in dissemination materials or online channels), and
- 8% social media traffic (most of the users come from Facebook and Twitter).

Figure 5 (on the next page) 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 47% of the users[8] land at the homepage, further 17% land at the “Online Labs” page and about 9% at the “Call for Schools” page. About 42% of the users (15,200 users) exit the website directly after landing either from the homepage (which provides the “Go-Lab Portal” button and the links to the Go-Lab Repository, Authoring, and Tutoring Platforms) or from the “Online Labs” page (providing “Go-Lab Portal” button)[9]. Most of these users proceed to the Go-Lab Repository, which receives about 12,914 users forwarded from the Go-Lab website (see Section 2.2.2, Figure 7). In general, the structure of the users flow is similar to the users flow from the previous year.

In average, a website session lasts about 2 minutes 33 seconds (which is 45 seconds less than in the Year 2) in which a user views in average 2 pages (which is one page less than in the Year 2). However, most of the visitors might use the project website as an access point to the Go-Lab Repository (in the Year 3, three times more users have been forwarded to the Repository than in the Year 2). In the next section, some statistics from the Go-Lab Repository are provided.

[8] 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.

[9] Here, only drop-outs potentially leading to the Go-Lab Portal are considered. The overall bounce rate for the website is 47% of the unique visitors.

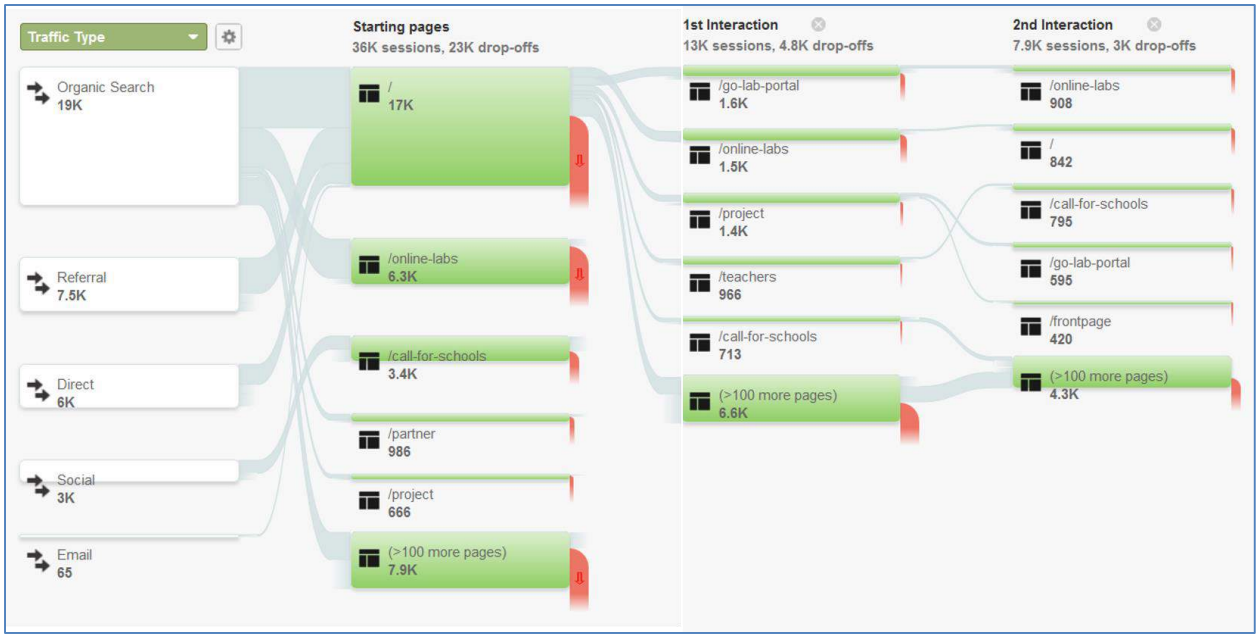

Figure 5: Users flow on the project website (Year 3)

2.2.2 Golabz Repository

The Go-Lab Repository[10] (Golabz, www.golabz.eu) is a part of the Go-Lab Portal, which is used as a landing page of the Portal and is connected to the project website with the "Go-Lab Portal" button and multiple links. In the time period from the 1st November 2014 to the 30th September 2015 Golabz was visited by 32,422[11] unique visitors (compare to 7,307 unique visitors in the Year 2). 60% of these users are new visitors and 40% are returning visitors.

Figure 6 represents the usage statistics of Golabz. As one can see from the chart, the number of users remains more or less constant during the year, varying from about 50-60 users per day on weekends to about 160-190 users per day during the working days. Several peaks on the chart (over 200 users) are related to the implementation activities conducted in different countries, as well as Go-Lab workshops during the Summer Schools (JTEL, Go-Lab, Inspiring Science, etc.). The usage statistics of Golabz and their connection to the implementation activities are discussed in the Deliverable D6.4 Report on development of the virtual Go-Lab user community - V1 (M36).

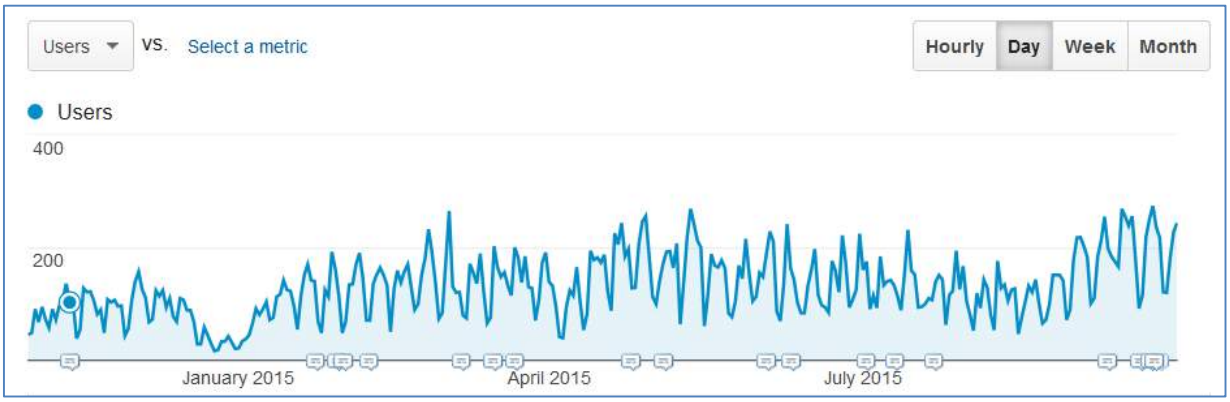

Figure 6: Unique visitors in Go-Lab Repository (Year 3)

[10] The development of the Go-Lab Repository is documented in the Deliverables of the Work Package 5. In the Deliverable D9.4 (this section) we concentrate on the usage statistics and connection of the Repository with other elements of Go-Lab dissemination infrastructure.
[11] Excluding the developers from IMC.

The traffic sources in the Repository are represented as follows: 42% referral traffic (compare to 36% in the Year 2), 32% organic search (24% in the Year 2), 23% direct traffic (36% in the Year 2), and 3% social media traffic (same as in the Year 2). This development represents, firstly, that more users come to the Repository from other websites and, secondly, that the Repository is easy to find if searching in the internet (organic search).

Analysing the referral traffic, we see that most of the users come from the Go-Lab website (58% of the referral traffic, 12,914 sessions), Graasp (12%, 2,756 sessions), Go-Lab EA (https://go-lab.ea.gr, 4%, 776 sessions), and STEMfinity (http://www.stemfinity.com, 1%, 245 sessions). Figure 7 represents the sources of the referral traffic in the Year 3.

Source	Acquisition			Behavior		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
	22,089	49.24%	10,876	28.20%	5.61	00:05:58
go-lab-project.eu	12,914	53.76%	6,942	19.94%	6.24	00:06:10
graasp.eu	2,756	1.05%	29	17.89%	7.27	00:09:37
floating-share-buttons.com	802	100.00%	802	89.65%	1.10	00:00:48
golab.ea.gr	776	39.18%	304	18.69%	7.10	00:07:33
stemfinity.com	245	61.63%	151	49.80%	2.99	00:03:23

Figure 7: Go-Lab Repository referral traffic sources (Year 3)

As for the social traffic, most of users come to the Go-Lab Repository from Facebook, Disqus, Twitter, Google+, and Blogger.[12]

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[13], 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 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

[12] Go-Lab does not have official channels at Disqus and Blogger, so the traffic from these resources may be explained with publications by consortium members or project-external persons.
[13] 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”.

partners. Google+ has quite mixed auditory. Additionally to the main project groups, an Estonian Facebook group[14] and two Facebook groups for Go-Lab Summer School participants[15] (in Volos, 2013, and Marathon 2014-2015) 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 19th October 2015, the project Facebook page counts 661 "likes" (329 of them are from the Year 3). The main Facebook group has 697 members (668 of them are project external; 321 members joined in the Year 3). The Google+ and LinkedIn groups currently have 75 (60 external; 30 joined in the Year 3) and 76 (59 external; 13 joined in the Year 3) members accordingly. The Go-Lab Twitter channel has 593 followers (most of them project extern, no exact information; 304 joined in the Year 3) and follows 133 members (19 new compared to the Year 2).

SlideShare (16 followers, 13 of them project extern; 5 joined in the Year 3) and Flickr (8 followers; not known if project extern; 1 joined in the Year 3) are not actively used, as most of the content is published either in the communities or at the support page of Golabz (http://www.golabz.eu/support). The YouTube channel increased the number of its followers by 32 users and currently counts 70 followers (not known if project extern). This channel becomes more popular as new Go-Lab videos are being published (see content statistics below).

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 in the third project year. 46% of the group members and followers (in all communities and channels) joined Go-Lab in the third project year.

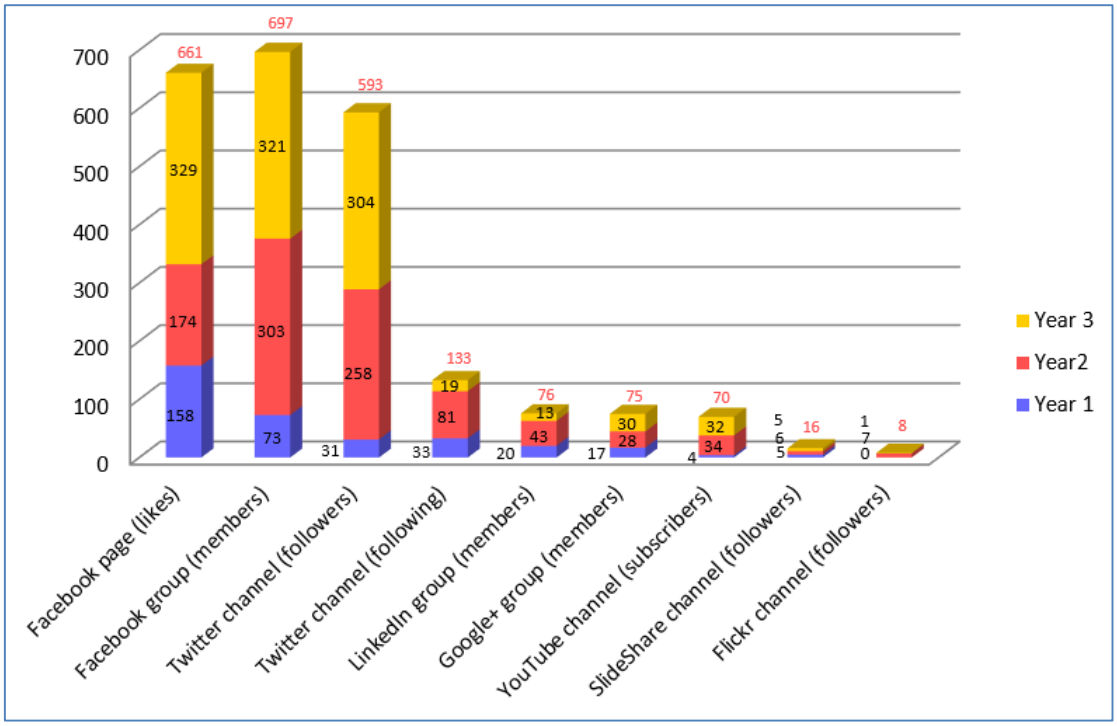

Figure 8: Go-Lab Social Media Audience (Year 1, Year 2, Year 3)

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

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 19th October 2015, project Facebook page counts 134 posts (96 from the Year 3), Facebook group – 563 posts (310 from the Year 3), Google+ group – 235 posts (97 from the Year 3), LinkedIn group – 43 posts (15 from the Year 3), YouTube channel – 50 shared videos (9 from the Year 3) and 35 own uploads (25 from the Year 3), SlideShare channel – 10 presentations (8 from the Year 3), Flickr channel – 22 albums (9 from the Year 3) representing 238 pictures (65 from the Year 3). Go-Lab Twitter channel currents counts 1,377 tweets and retweets (208 from the Year 3).

Figure 9 represents social media content statistics, including the number of posts in the Year 1, Year 2, Year 3, as well as cumulative numbers.

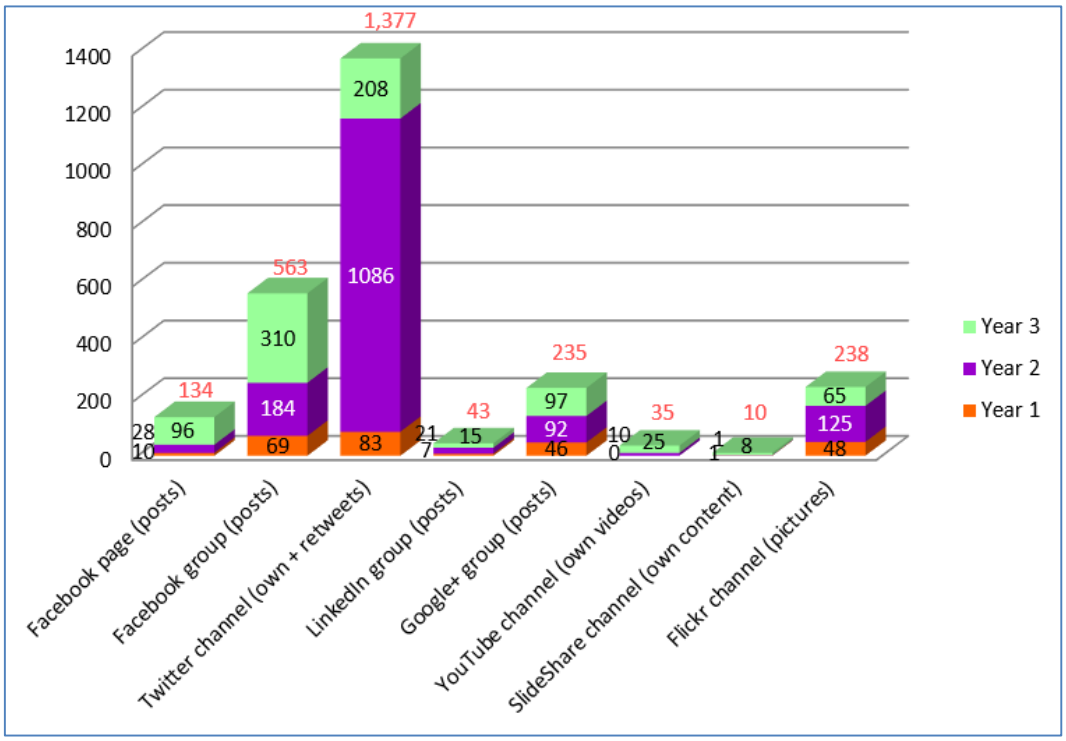

Figure 9: Social Media Content Statistics (Year 1, Year 2, Year 3)

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, 58 posts were published in the Facebook group (compare to 17 in the Year 2) and 3 discussions were started in the LinkedIn group. Also, the project's posts on Twitter were retweeted and shared or the project was mentioned in the posts of other users 1,118 times. 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.

At the end of the third project year, Go-Lab started two new series of weekly posts in the social media (Facebook, Google+, Twitter). The first series, called "Have you already known", provides interesting facts about Go-Lab and Tips & Tricks on the use of the Go-Lab Portal. The second series, "Lab of the week", highlights online labs newly added to the Go-Lab Repository. Each series has its own design, so one can visually distinguish them from the others.

Figure 10 represents a "Have you already known" banner. In the social media, such banner is accompanied with an explanation text and links (if necessary).

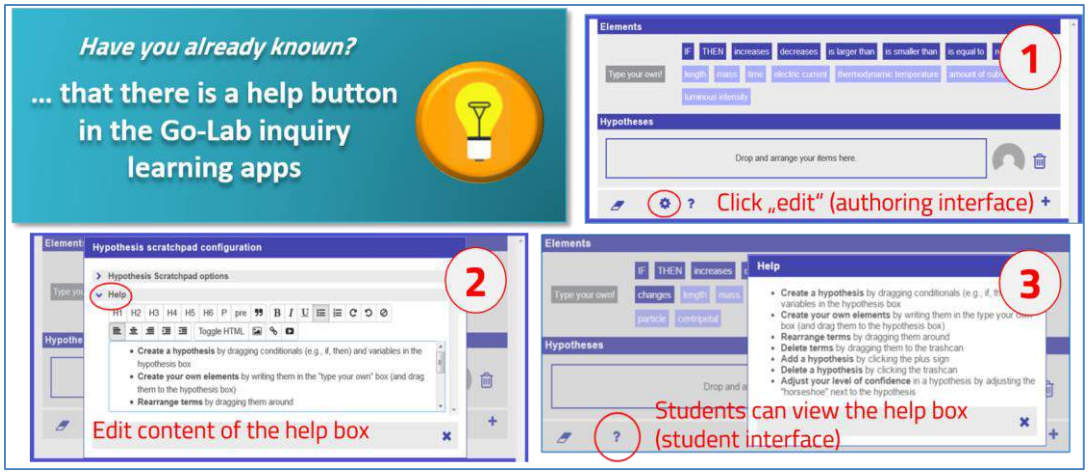

Figure 10: "Have you already known" post

Besides its own social media groups, Go-Lab publishes some of its announcements in about 50 Facebook and Google+ groups, for example, Science Teachers in Europe (3,845 members)[16], Teaching Online – Facilitating Online Learning (7,031 members)[17], Future Classroom Scenarios (1,675 members)[18], STEM Educators (15,035 members)[19], Teachers helping Teachers (16,184 members)[20], Creative Classroom Lab (262 members)[21], Galileo Teachers Groups (403 members)[22], and others.

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, 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 19th October 2015, there are 277 project external recipients of this newsletter (compare to 172 recipients by the end of Year 2 and 34 recipients by the end of Year 1). The distribution of the recipients by countries follows the distribution model from the past years: most of the recipients come from Spain (17%), followed by Portugal (15%), Romania (8%), Italy (6%), and Greece (5%).

Figure 11 represents the newsletter recipients by country (for leading countries) and region. Here, only those countries counting more than 2% of the recipients are represented. Other European countries count 0.4-1.8 percent of the recipients each, which is in the sum 17% of all recipients.

[16] Science Teachers in Europe: https://www.facebook.com/groups/ScienceTeachersEurope
[17] Teaching Online: https://www.facebook.com/groups/372438642805998/
[18] Future Classroom Scenarios: https://www.facebook.com/groups/futureclassroomscenarios
[19] STEM Educators: https://plus.google.com/u/0/communities/112904336188381403474
[20] Teachers helping teachers: https://plus.google.com/u/0/communities/113166595976911311283
[21] Creative Classroom Lab: https://www.facebook.com/groups/1411752155722721/
[22] Galileo Teachers Group: https://www.facebook.com/groups/galileoteachers/

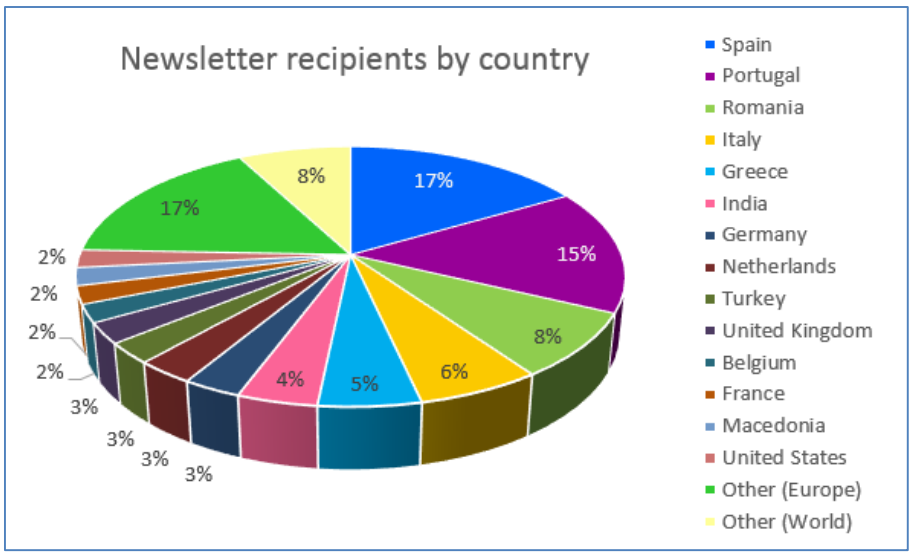

Figure 11: Newsletter recipients by country and region (Year 3)

83% of the recipients work in Education, Training and Library sector, as well as in Science and Research (9%) and Information Technology (3%) sectors[23]. 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 Using external channels

Besides its main dissemination channels, the Go-Lab project uses also other online dissemination media. In the Year 3, Go-Lab published two press releases in the Open Education Europa portal (OEE, www.openeducationeuropa.eu) to promote the Go-Lab Portal and the School Pilot Activities. Other press releases were published at Novaator portal (web portal for science popularization)[24], in the Journal for Estonian teachers (online and print version)[25], and at derStandard.at online portal in Austria[26]. Moreover, the Go-Lab project and Portal were promoted in the Newsletter published by IMC for its employees, partners, and customers active in the field of Technology-Enhanced Learning. A newsletter for Dutch teachers was sent by the University of Twente. A press-release was published at the University of Tartu e-learning newsletter[27] and at the E-õppe uudiskiri (newsletter)[28]. The target audience of these press releases is estimated to about 15,000 readers.

Several online press releases are planned at STEM-forum (MINT-forum)[29], Digital School Magazine (DIGITALE.SCHULE Magazin) [30], and KIT-Initiative (Kreativität, Innovation und Technik)[31]. An article for Digital Agenda for Europe[32] has been submitted and will be published soon.

[23] No structural changes compared to previous years.
[24] Go-Lab press release at Novaator: http://novaator.err.ee/v/haridus/fcee8632-25d1-49e1-b5d9-6609de5f55be
[25] Go-Lab press release in the Journal for Estonian teachers: http://opleht.ee/21799-internetipohised-virtuaal-ja-kauglaborid-tuuakse-loodusainete-opetajateni
[26] Go-Lab press release at derStandard.at: http://derstandard.at/2000010659335/Das-Labor-mit-Fernbedienung
[27] Go-Lab press release at the University of Tartu e-learning newsletter: http://etu.ut.ee/kevad-2015/e-oppe-projektidest
[28] Go-Lab press release at E-õppe uudiskiri newsletter: http://uudiskiri.e-ope.ee/?p=13258
[29] MINT-Forum: http://mintforum.de
[30] DIGITALE.SCHULE Magazin: http://digitale.schule
[31] KIT-Initiative: http://www.kit-initiative.de
[32] Digital Agenda for Europe: http://ec.europa.eu/digital-agenda/en

The Go-Lab Call for Schools was actively promoted through Facebook[33] and Twitter[34] channels of European Schoolnet (9,700 and 10,300 members/followers accordingly), Twitter channel of Scientix[35] (3,530 followers), Twitter channel of CORDIS[36] (9,953 followers), in eTwinning Portal[37] (about 300,000 readers), and eTwinning Plus Portal[38] (about 2,000 readers).

In the Year 3 Go-Lab established cooperation with Open Discovery Space (ODS) and Inspiring Science Education (IS) consortia. Go-Lab is listed on the ODS website in the "ODS friends" directory[39] and on the IS website at the "Related Initiatives" page[40]. Go-Lab is represented in the ODS/IS-Portal with a Go-Lab Teachers Community[41] and a Go-Lab Community for Portuguese teachers ("Laboratórios Online para a Astronomia - GO-LAB I")[42]. Go-Lab and ODS/IS promote the most important news and events of each other in the projects' news blogs and social media channels.

In addition, the Go-Lab Portal was listed in MERLOT II Repository (Multimedia Education Resource for Learning and Online Teaching), which is the biggest online repository for STEM-teaching resources and tools[43].

Finally, in March 2015 Go-Lab recorded a radio interview (Estonian radio), which is available online at "KUKU podcasts"[44].

2.3 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.

2.3.1 Dissemination activities by countries

In the third project year, Go-Lab was represented at multiple conferences and scientific events, as well as in scope of large-scale teacher events and small workshops. A total amount of 7,502

[33] Facebook channel of EUN: https://www.facebook.com/european.schoolnet
[34] Twitter channel of EUN: https://twitter.com/eu_schoolnet
[35] Twitter channel of Scientix: https://twitter.com/scientix
[36] Twitter channel of CORDIS: https://twitter.com/myCORDIS
[37] Go-Lab publication in eTwinning Portal: http://www.etwinning.net/en/pub/news/news/go_lab_open_call_for_schools.htm
[38] Go-Lab publication in eTwinning Plus Portal: http://plus.etwinning.net/en/pub/keep_up-to-date/news/go_lab_open_call_for_schools.htm
[39] OSD friends webpage: http://opendiscoveryspace.eu/friends-ods
[40] IS related initiatives page: http://www.inspiringscience.eu/project/initiatives
[41] Go-Lab Teachers Community in ODS/IS-Portal: http://portal.opendiscoveryspace.eu/community/go-lab-teachers-community-489347
[42] Go-Lab Community for Portuguese Teachers in ODS/IS-Portal: http://portal.opendiscoveryspace.eu/community/laboratorios-online-para-astronomia-go-lab-i-330378
[43] Go-Lab in MERLOT II Repository: https://www.merlot.org/merlot/viewMaterial.htm?id=1050883&hitlist=keywords%3DGo-LAb&fromUnified=true
[44] Go-Lab radio interview: http://podcast.kuku.ee/2015/03/19/intervjuu-2015-03-191201

stakeholders[45] (mostly teachers, but also scientists, online lab providers, and representatives of associations and projects) was reached. Moreover, about 13,000 stakeholders were addressed with 24 project booths and demonstrations at conferences and exhibitions.

The dissemination events were conducted in 22 countries, mostly in Europe, but also in Brazil, Chile, Israel, Thailand, São Tomé and Prínci, and USA. 89% of events were conducted in pilot countries (Austria, Belgium, Bulgaria, Cyprus, Estonia, Germany, Greece, Italy, Netherland, Portugal, Spain, Switzerland, and UK) covering 83% of participants. There were no large-scale dissemination activities in Poland and Romania (however, teachers from these countries were addressed by the project contest: 3 winners of the contest "Teaching Through Inquiry" come from Poland and Romania). Moreover, teachers from all pilot countries were addressed by international events (mostly organized in cooperation with other projects, like Scientix, Future Classroom Lab, GTTP, and others) which took place in Belgium, Netherlands, Greece, Spain, Israel, UK, and USA.

Table 2 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 176 events, number of participants in the country and their percentage of a total of 7,502 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 Israel there was one presentation for 300 participants; the average number of participants is 300. In Portugal there were 53 events, in which a total number of 1,592 participants took part; the average number of participants per event is, thus, 1,592/53 = 30 participants.

Table 2: Number of dissemination events and participants per country

Country	Nr. of events	Nr. of participants	Av. Nr. participants/ event	Percent of all events	Percent of all participants
Austria	8	235	29	5%	3%
Belgium	6	164	27	3%	2%
Brazil (presence/ online)	2	12	6	1%	0%
Bulgaria	1	29	29	1%	0%
Chile	1	6	6	1%	0%
Cyprus	6	97	16	3%	1%
Estonia	19	478	25	11%	6%
Finland	4	164	41	2%	2%
France	2	90	45	1%	1%
Germany	3	59	20	2%	2%
Greece	10	1289	129	6%	17%
Ireland	1	120	120	1%	2%
Israel	1	300	300	1%	4%
Italy	6	157	26	3%	2%
Netherlands	9	512	57	5%	7%
Portugal	53	1592	30	30%	21%

[45] An approximate number based on partners' estimations, as of 19th October 2015

Country	Nr. of events	Nr. of participants	Av. Nr. partici-pants/ event	Percent of all events	Percent of all participants
São Tomé and Prínci	2	240	120	1%	3%
Spain	5	345	69	3%	5%
Thailand	2	200	100	1%	3%
Turkey	1	150	150	1%	2%
United Kingdom	30	1151	38	17%	15%
USA	4	112	28	2%	1%
TOTAL	**176**	**7502**	**43**		

Figure 12 visualizes information represented above. Blue bulks stand for percentage of events conducted in particular country (of a total number of 176 events) and red bulks – for percentage of participants in the country (of a total of 7,502 participants), and green points for an average number of participants per event per country.

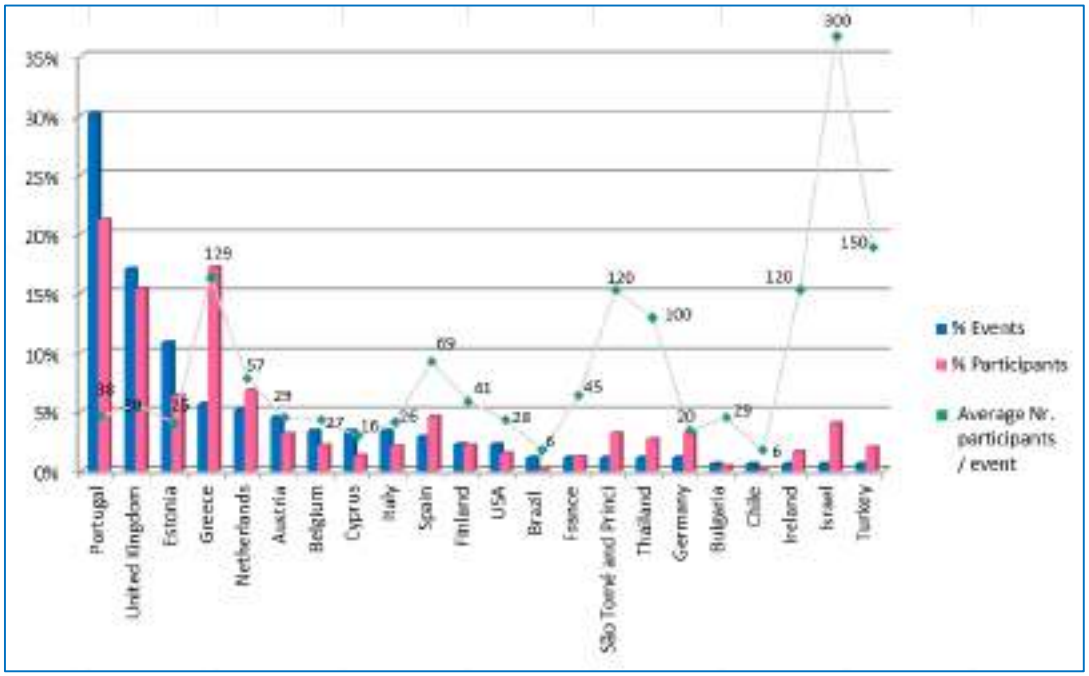

Figure 12: Number of dissemination events and participants per country

The distribution of events per country in the Year 3 follows the trend from the Year 2: the "dissemination activity leaders" are Portugal, Greece, and Estonia. Compared to the Year 2, UK has significantly increased the number of dissemination activities taking the second place after Portugal in the Year 3. The leaders in the number of participants per event are Israel (300), Turkey (150), Greece (129), Ireland (120), São Tomé and Prínci (120), and Thailand (100). In most of these countries, only one or two events for a large audience took place. In Greece, ten events took place, among them a Go-Lab Portal presentation for 600 high school students at a workshop of the Greek Physics Union, which is "responsible" for the high average number of participants per event. On the other hand, multiple small workshops and presentations took place in Austria (average number of participants 27), Belgium (29), Cyprus (16), Germany (20), Italy (26), and other countries.

2.3.2 Presentations, workshops, synergy actions

In the Year 3, the Go-Lab partners gave 101 presentations (including key note speeches mentioning Go-Lab, invited talks, paper presentations, etc.) for 5,286 participants, conducted 54 workshops and hands-on sessions with 1,052 participants, organized 21 joint events together with other projects and organizations for 1,164 participants. In addition, Go-Lab was represented with a booth or distributed project leaflets at 24 events targeting around 13,000 participants. An average number of participants per presentation was 52 persons, 19 persons per workshop, and 55 persons per joint event.

Figure 13 represents the number of dissemination events and participants (in brackets) in the Year 2 and Year 3.

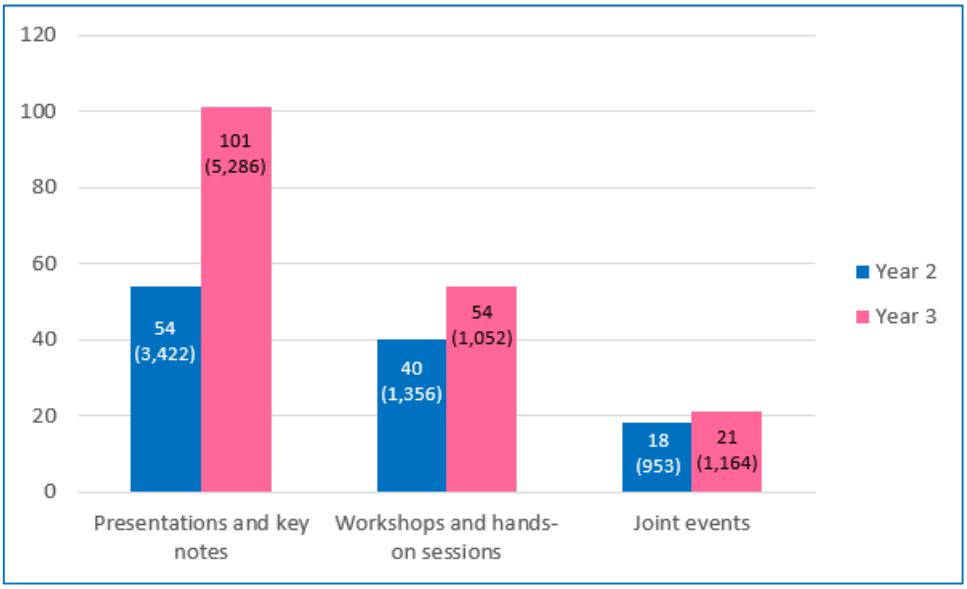

Figure 13: Number of dissemination events and participants

Presentations (101 events/ 5,286 participants):

The project was represented at the ESERA2015 conference, REV, EDUCON, exp.at, EDULEARN, CELDA, EC-TEL, CSCL, EiED14, iSER14, and many other international and national conferences. Moreover, Go-Lab partners gave presentations at large scientific and teacher events like National Astronomy Meeting, UK, workshops of the Greek Physics Union, conferences for biology, physics, and chemistry teachers in Estonia, and other events. In addition, Go-Lab was represented during a session devoted to EU-projects at the LEARNTEC congress, which the biggest eLearning congress in Germany.

Workshops (54 events/ 1,052 participants):

In the Year 3, Go-Lab organized and conducted three workshops during the JTEL Summer School in Italy, a hands-on workshop at the ESERA2015 conference in Finland, a workshop at the NPSE conference in Italy, a demonstration at the EARLI conference in Cyprus, and a special session at the EDUCON conference in Estonia. Go-Lab's demonstration at the exp.at conference received the Best Demo Award of the conference. Multiple workshops for small groups of teachers were organized in most of the pilot countries.

Project booths (24 events/ 12,990 potential participants):

The project booths were organized at the Astrofest, UK, the National Astronomy Meeting, UK, and the Cheltenham Science Festival, UK. In addition, Go-Lab leaflets were distributed at the

international conference "Innovative science teaching. The way forward?" organized by the EU Comenius project INSTEM, the Robotex14 conference in Estonia, and during the Scientix conference in UK. Finally, Go-Lab materials were disseminated during teachers workshops and training activities in different countries.

Go-Lab Summer School (28 participants):

The most important project event, the Go-Lab Summer School (http://golab.ea.gr) was conducted in Marathon, Greece from 12th to 17th July 2015. 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 mainly an implementation activity, it is not included in statistics above and is described in details in the Deliverable D6.6 “Go-Lab user communities support framework and guidelines” (M36).

Synergy actions with related organizations (21 events/ 1,164 participants)

Go-Lab conducted 13 teacher events targeting 865 participants in cooperation with Scientix, Future Classroom Lab project, Global Hands-on Universe, Galileo Teacher Training Programme, and Ark of Inquiry project. Furthermore, Go-Lab was represented at the Summer Schools of Open Discovery Space, Inspiring Science Education, and Quantum SpinOff projects. Cooperation with OnlineLabs4All project and eSTEeM (the OU center for STEM pedagogy, UK) was established. Several events took place in cooperation with IEEE (standardization workshops), as well as FORGE (see below) and weSPOT projects (cooperation on the use of Go-Lab tools in weSPOT).

Importantly, a new EATEL Special Interest Group on Remote Labs and Online Experimentation was formed by the Go-Lab and FORGE projects. The main goal of this SIG is to drive and promote remote labs and online experimentation and to offer the technologies that can help stakeholders build experimental infrastructures and use them across different domains. The SIG aims at creating an open community and ecosystem where a wide range of educational resources and different setups for scientific experimentation are shared among the community members. The SIG also aims at developing best pedagogical and technical practices to broaden the adoption of remote labs and online experimentation in the teacher and provider communities.[46]

Finally, contact to new online lab owners was established allowing Go-Lab to integrate multiple online labs to the Go-Lab Repository. Among these lab providers are, for example, the Concord Consortium (http://concord.org), USA, RemLabNet (http://www.remlabnet.eu), Czech Republic, Instituto Superior Técnico (http://tecnico.ulisboa.pt/en), Portugal, and others. The cooperation partners who expressed interest in being listed on the Go-Lab website are presented at the “External Partners” page: http://www.go-lab-project.eu/external-partner.

2.3.3 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 third project year, Go-Lab published 25 scientific papers in conference proceedings, 8 journal articles, and 3 book chapters:

Cao, Y.; Govaerts, S.; Dikke, D.; Faltin, N.; Gillet, D.: Helping each other teach: design and realisation of a social tutoring platform. In: Journal of Immersive Education EiED - Proceedings of 4th European Immersive Education Summit, Vienna, Austria, Nov. 24-26, 2014.

[46] Source: webpage of the EATEL SIG on Remote Labs and Online Experimentation: http://ea-tel.eu/special-interest-groups/sig-remote-labs-and-online-experimentation/#sthash.xd0LVfbh.dpuf

Cao, Y.; Tsourlidaki, E.; Edlin-White, R.; Dikke, D.; Faltin, N.; Sotiriou, S.; Gillet, D.: STEM Teachers' Community Building through a Social Tutoring Platform. In: Proceedings of the14th International Conference on Web-based Learning, ICWL 2015, Guangzhou, China, Nov. 5-8, 2015.

Cao, Y.; Väljataga, T.; Tang, J. (eds.): New Horizons in Web-Based Learning. In: New Horizons in Web-Based Learning - ICWL 2014 Workshops, Lecture Notes in Computer Science: Vol. 8699. Publisher: Springer Verlag, 2014.

Cao, Y.; Kovachev, D.; Klamma, R.; Jarke, M.; Lau, R. W. H.: Tagging diversity in personal learning environments. In: Journal of Computers in Education, March 2015: Vol. 2, Issue 1, p. 93-121.

Centeno, R.; Rodriguez-Artacho, M.; Garcia, F.; Sancristobal, E.; Diaz, G.; Castro, M.: Towards learning resources rankings in MOOCs: A pairwise based reputation mechanism. In: Proceedings of the 6th IEEE Global Engineering Education Conference, EDUCON 2015, Tallin, Estonia, March 18-20, 2015.

De Jong, T.: Simulation-based learning. In: J. Spector (Ed.): The SAGE encyclopedia of educational technology, pp. 647-650. Thousand Oaks, CA: SAGE Publications, Inc.

De Jong, T.; Sotiriou, S.; Gillet, D.: Innovations in STEM education: The Go-Lab federation of online labs. In: Smart Learning Environments: Vol. 1 no. 3, p. 1-16, 2014.

Dikke, D.; Faltin, N.: Go-Lab MOOC – An online course for teacher professional development in the field of Inquiry-Based Science Education. In: Proceedings of the 7th International Conference on Education and New Learning Technologies in Barcelona, Spain, July 6-8, 2015.

Fernandez, G. C.; Borrego, R. C.; Plaza Merino, P.; Cañas Lopez, M. A.; Ruiz, E. S.; Castro Gil, M.; Mur Perez, F.: Mechatronics and robotics as motivational tools in remote laboratories. In: Proceedings of the 6th IEEE Global Engineering Education Conference, EDUCON 2015, Tallin, Estonia, March 18-20, 2015.

Fernandez, G. C.; Ruiz, E. S.; Gil, M. C.; Mur Perez, F.: From RGB led laboratory to servomotor control with web-sockets and IoT as educational tool. In: Proceedings of the 12th International Conference on Remote Engineering and Virtual Instrumentation, REV 2015, Bangkok, Thailand, Feb. 25-28, 2015.

Govaerts, S.; Cao, Y.; Faltin, N.; Cherradi, F.; Gillet, D.: Tutoring Teachers - Building an Online Tutoring Platform for the Teacher Community. In: Immersive Education, Communications in Computer and Information Science: Vol. 486, p. 39-51.

Halimi, W.; Salzmann, Ch.; Gillet, D.: The Smart Wind Turbine Lab. In: Proceedings of the 3rd Experiment@ International Conference, exp.at'15, Ponta Delgada, São Miguel Island, Azores, Portugal, June 2-4, 2015.

Heintz, M.; Law, E. L.: Solution-based Requirements Capture with PDot in an E-Learning Context . In: Proceedings of the 15th IFIP TC.13 International Conference on Human-Computer Interaction, INTERACT 2015, Bamberg, Germany, Sept. 14-18, 2015.

Heintz, M.; Law, E. L.; Manoli, C.; Zacharia, Z.; Van Riesen, S. A. N.: A survey on the usage of online labs in science education: Challenges and implication. In: Proceedings of the 6th IEEE Global Engineering Education Conference, EDUCON 2015, Tallin, Estonia, March 18-20, 2015.

Heintz, M.; Law, E. L.; Soleimani, S.: Paper or Pixel? Comparing Paper- and Tool-based Participatory Design Approaches. In: Proceedings of the 15th IFIP TC.13 International Conference on Human-Computer Interaction, INTERACT 2015, Bamberg, Germany, Sept. 14-18, 2015.

Kreiter, C.; Garbi Zutin, D.: Enhancing the Usability of the Blackbody Radiation Remote Lab. In: Proceedings of the 3rd Experiment@ International Conference, exp.at'15, Ponta Delgada, São Miguel Island, Azores, Portugal, June 2-4, 2015.

Kreiter, C.; Garbi Zutin, D.; Auer, M.E.: An HTML Client for the Blackbody Radiation Lab. In: Proceedings of the 12th International Conference on Remote Engineering and Virtual Instrumentation, REV 2015, Bangkok, Thailand, Feb. 25-28, 2015.

Manske, S.; Chounta, I.-A.; Rodríguez-Triana, M. J.; Gillet, D.; Hoppe; H. U.: Exploring Deviation in Inquiry Learning: Source of Creativity or the Root of all Problems?. In: Proceedings of the 23rd International Conference on Computers in Education, ICCE 2015, Asia-Pacific Society for Computers in Education, Hangzhou, China, Dec. 4, 2015.

Manske, S.; Hecking, T.; Chounta, I.-A.; Werneburg, S.; Hoppe; H. U.: Using Differences to Make a Difference: A Study in Heterogeneity of Learning Groups. In: Proceedings of the 11th International Conference on Computer Supported Collaborative Learning, CSCL 2015, Gothenburg, Sweden, June 7-11, 2015.

Pedaste, M.; Mäeots, M.; Siiman L. A.; De Jong, T.; Van Riesen, S. A. N.; Kamp, E. T.; Manoli, C. C.; Zacharia, Z. C.; Tsourlidaki, E: Phases of inquiry-based learning: definitions and the inquiry cycle. In: Educational Research Review: Vol. 14, p. 47-61, 2015.

Rodríguez-Triana, M. J.; Holzer, A.; Vozniuk, A.; Gillet, D.: Orchestrating Inquiry-Based Learning Spaces: an Analysis of Teacher Needs. In: Proceedings of the 14th International Conference on Web-based Learning, ICWL 2015, Guangzhou, China, Nov. 5-8, 2015.

Rodríguez-Triana, M.J.; S. Govaerts,W. Halimi, A. Holzer, Ch. Salzmann, A. Vozniuk, and D. Gillet,: Rich Open Educational Resources for Personal and Inquiry Learning Agile Creation, Sharing and Reuse in Educational Social Media Platforms. In: Proceeding of the International Conference on Web and Open Access to Learning, ICWOAL '2014, Social Networks & Open Access to Learning, Dubai, United Arab Emirates, Nov. 25-27, 2014.

Ros, S.; Hernandez, R.; Read, T.; Rodriguez Artacho, M.; Pastor, R.; Diaz Orueta, G.: UNED OER Experience: From OCW to Open UNED. In: Education, IEEE Transactions on, vol.57, no.4, pp.248-254, Nov. 2014

Salzmann, Ch.; Govaerts, S.; Halimi, W.; Gillet, D.: The Smart Device Specification for Remote Labs. In: International Journal of Online Engineering (iJOE): Vol. 11 no. 4, 2015.

Salzmann, Ch.; Govaerts, S.; Halimi, W.; Gillet, D. : The Smart Device specification for remote labs. In: Proceedings of the 12th International Conference on Remote Engineering and Virtual Instrumentation, REV 2015, Bangkok, Thailand, Feb. 25-28, 2015.

Sergis, S.; Vlachopoulos, P.; Sampson, D.: Flipped Classroom Teaching Model Templates for STEM Education. In: Proceedings of the Open Discovery Space Conference, EDEN Open Classroom 2015, Athens, Greece, Sep. 18-21, 2015.

Tawfik, M.; Salzmann, Ch.; Gillet, D.; Lowe, D.; Saliah-Hassane, H.; Sancristobal, E.; Castro, M.: Laboratory as a Service (LaaS): a Novel Paradigm for Developing and Implementing Modular Remote Laboratories. In: International Journal of Online Engineering (iJOE): Vol. 10 no. 4, p. 13-21, 2014.

Tsourlidaki, E.; Zervas, P.; Sotiriou, S.; Sampson, D. : An Investigation with European School Teachers on how to Characterize Virtual and Remote Labs. . In: Proceedings of the 6th IEEE Global Engineering Education Conference, EDUCON 2015, Tallin, Estonia, March 18-20, 2015.

Vozniuk, A.; Rodriguez-Triana, M. J.; Holzer, A.; Govaerts, S.; Sandoz, D.; Gillet, D.: Contextual Learning Analytics Apps to Create Awareness in Blended Inquiry Learning. In: Proceedings of the 14th International Conference on Information Technology Based Higher Education and Training, ITHET 2015, Lisbon, Portugal, June 11-13, 2015.

Zacharia, Z.C.; Manoli, C.; Xenofontos, N.; De Jong, T.; Pedaste, M.; Van Riesen, S.; Kamp, E.; Mäeots, M.; Siiman. L.; Tsourlidaki, E.: Identifying potential types of guidance for supporting student inquiry when using virtual and remote labs: A literature review. In: Educational Technology Research and Development: Vol. 63, p. 257-302.

Zervas, P.; Authentopoulou, A.-E.; Sampson, D.: Characterizing Virtual and Remote Laboratories with Educational Metadata. In: Proceedings of the Open Discovery Space Conference, EDEN Open Classroom 2015, Athens, Greece, Sep. 18-21, 2015.

Zervas, P.; Sergis, S.; Sampson, D.; Fiskilis, S.: Towards Competence-Based Learning Design Driven Remote and Virtual Labs Recommendations for Teachers. In: Technology, Knowledge and Learning. Springer: Vol. 20 no. 2, p. 185-199, Netherlands, July 2015.

Zervas, P.; Tsourlidaki, E.; Sotiriou, S.; Sampson, D.: Towards a Metadata Schema for Characterizing Lesson Plans Supported by Remote and Virtual Labs for School Science Education. In: Proceedings of the 12th International Conference on Cognition and Exploratory Learning in Digital Age, CELDA 2015, Dublin, Ireland, Oct. 2015.

Dziabenko, O.; García-Zubía, J.: Planning and Designing Remote Experiment for School Curriculum. In: Proceedings of the 6th IEEE Global Engineering Education Conference, EDUCON 2015, Tallinn, Estonia, March 18-20, 2015.

Rodriguez-Gil, L.; Orduña, P.; Bollen, L.; Govaerts, S.; Holzer, A.; Gillet, D.; López-de-Ipiña, D.; García-Zubia, J.: The AppComposer Web Application for School Teachers: A Platform for Translating and Adapting Educational Web Applications. In: Proceedings of the 6th IEEE Global Engineering Education Conference, EDUCON 2015, Tallinn, Estonia, March 18-20, 2015.

Angulo Martínez, I.; García Zubía, J.; Martinez Pieper, G.; Hernández Jayo, U.; López de Ipiña González de Artaza, D.; Dziabenko, O.; Orduña Fernández, P.; Rodríguez Gil, L.; Van Riesen, S. A. N.; Anjewierden, A.; T. Kamp, E.; De Jong, T.: Archimedes Remote Lab for Secondary Schools. In: Proceedings of the 3rd Experiment@ International Conference, exp.at'15, Ponta Delgada, São Miguel Island, Azores, Portugal, June 2-4, 2015.

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.

2.3.4 Dissemination materials

In the Year 3, the Go-Lab Portal Flyer was created. The front page of the flyer provides an overview of the tools available in the Go-Lab Repository (online labs, inquiry scaffolds, inquiry learning spaces) and a link to the Repository. The back page of the flyer represents a five-step guide on how to start working with the authoring tool Graasp and create an ILS; the link to the Graasp tool is available. 5,000 flyers were printed and distributed among the partners.

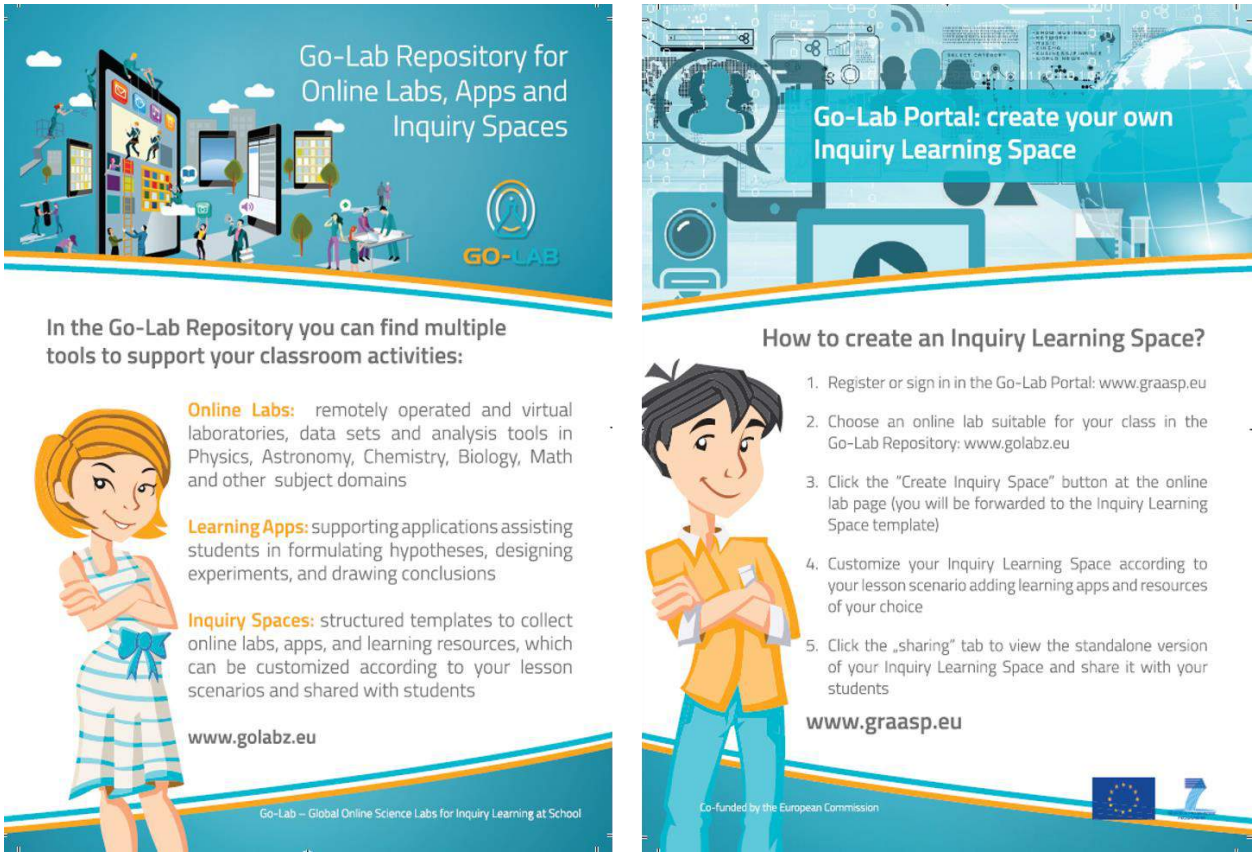

Figure 14: Go-Lab Portal Flyer

2.4 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.

2.4.1 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 3 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 4.

Table 3: 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.
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.	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

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.	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 4 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, Year 2, and Year 3. 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 3 are given.

Table 4: 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	**26,722**	-
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	**52**	-
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.)	**811 (1,685 cum.)**	-
K1.4	Project Engagement	*Own target setting; +2% to previous year*	-	*481 per year*	*491 per year*	*501 per year*
			236	1,431	**768**	-
K1.5	Audience Engagement	*Own target setting; av. 2 actions/ new member*	-	*254 per year*	*266 per year*	*280 per year*
			243	563	**978**	-

Comments:

In the Year 3, all target values have been achieved. The KPIs are calculated as follows:

K1.1: using Google Analytics

K1.2: using http://openlinkprofiler.org. Previously the alexa.com service was used. However, we found out that obviously not all backlinks are counted. Also, it is not possible to view the link sources, so it was decided to switch to another service.

K1.3: 321 Facebook group members + 304 Twitter followers + 13 LinkedIn group members + 30 Google+ group members + 32 YouTube followers + 5 SlideShare followers + 1Flickr follower + 105 newsletter recipients = 811 (excluding project members)

K1.4: 96 Facebook page posts + 310 Facebook group posts + 208 Tweets and Retweets + 15 LinkedIn posts + 97 Google+ posts + 25 own YouTube videos + 8 SlideShare presentations + 9 Flickr albums = 768

K1.5: 329 Facebook page likes + 58 discussions on Facebook started by audience + 5 direct contacts on Facebook + 3 discussions on LinkedIn started by audience + 352 mentions and re-tweets on Twitter + 23 likes of YouTube videos + 40 likes, downloads, sharing and embedding actions of SlideShare presentations + 168 sharing actions on the website (unique events) = 978

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 3 is 1,448.

2.4.2 Offline Dissemination

The following KPIs were defined in the Deliverable D9.2 and describe offline dissemination activities of the project. Table 5 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 6.

Table 5: 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 6 provides target values for each project year (beginning with the Year 2) and achieved values for the Year 1, Year 2, and Year 3. 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 3 are given.

Table 6: 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	**155/6,338**	-
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	**21/1,164**	-
K2.3	Publication Number	*DoW*	*10 per year*	*25 per year*	*35 per year*	*45 per year*
			10	16	**36**	-

Comments:

The target values for the Year 3 and Year 4 were adjusted at the end of Year 2 (see Deliverable D9.3 “Report on Dissemination and Exploitation Activities – Year 2” (M24)).

In the Year 3, all target values have been reached.

2.5 Go-Lab MOOC

The Go-Lab Massive Open Online Course “Using online labs in the classroom: an introductory course for teachers” is being developed to support school teachers and other Go-Lab users in their interest for inquiry learning with online laboratories. The concept of the Go-Lab MOOC, its format, structure, content development process, and planned technical implementation are described in the Deliverable D9.3 “Report of Dissemination and Exploitation Activities, Year 2 (M24)”. This section represents the current status of the course development and describes available learning modules and contents.

In the third project year, the Go-Lab team made significant progress in the development of the course content. Table 7 summarizes the current status.

Table 7: Development status of the Go-Lab MOOC

Module Nr.	Module name	Responsible partner	Represented online labs and tools	Current status
1	Inquiry Learning with Online Labs	UT, EA	-	Final. Incl. 3 video lectures and 3 additional readings
2	Creating lesson scenarios and inquiry spaces	EPFL, EA	Go-Lab Portal incl. all its interfaces	Final. Incl. 1 video tutorial, 9 demo-videos, and text documents (video tutorial script, Go-Lab Portal manual, and Go-Lab ILS template)
3	Exploring the Sun	NUCLIO	Sun4All data archive & SalsaJ tool	Pre-final. 1 video lecture and 3 video excursions are finalized. 1 video tutorial is in the finalization phase. An ILS-template has to be implemented in the Portal.
4	Exploring galaxies	USW	Faulkes Telescope, Galaxy Crash	Final. Incl. 1 video lecture, 3 demo-videos, video lecture script, 2 ILS-templates.
5	Conservation of momentum	IASA	HY.P.A.T.I.A.	Final. Incl. 3 video lectures, 3 video lecture scripts, and 2 ILS-templates.

In the following section, the course modules are represented in more detail. As the course videos are not published yet, we provide some screenshots in this section.

2.5.1 Module 1: Inquiry Learning with Online Labs

This module provides an introduction to the course and gives the participants an overview about inquiry learning methods, online labs and their use for teaching science in school. The module contains three video lectures (by Prof. Ton de Jong, UT, and Dr. Sofoklis Sotiriou, EA), as well as three research publications that are useful to understand the topic. As this is a theoretical module, it does not foresee any exercises. However, the course participants will be asked to have a look at the Go-Lab Portal and create their user accounts (if they do not have those yet).

The videos were created by the teams of UT, EUN-Academy, EA, and IMC.

Figure 15: Prof. Ton de Jong giving a lecture "Inquiry learning in science domains"

2.5.2 Module 2: Creating lesson scenarios and inquiry spaces

In this practice-oriented course module the participants are introduced to the use of the Go-Lab Portal (including Go-Lab Repository and the authoring platform Graasp) in detail. The module provides a 45-minutes video tutorial (by Eleftheria Tsourlidaki, EA) explaining the whole authoring process beginning with creation of a lesson plan using a Word-template and finishing with sharing of an implemented Inquiry Learning Space (ILS) with students. A PowerPoint-script to the video tutorial, as well as the Go-Lab Portal manual and represented Word-template will be provided for download.

Besides, there are nine short demo-videos (by Dr. Sten Govaerts and Dr. Adrian Holzer, EPFL) demonstrating particular functionalities of the Portal. These demo-videos are already available in the Go-Lab YouTube channel (https://goo.gl/jfIH1x) and linked to the Go-Lab support page (http://www.golabz.eu/support).

This module will offer several exercises, so the course participants can practice in creating lesson plans using the Go-Lab template and implementing them in ILSs using the Go-Lab Portal.

The videos were created by EA, EPFL, and IMC teams.

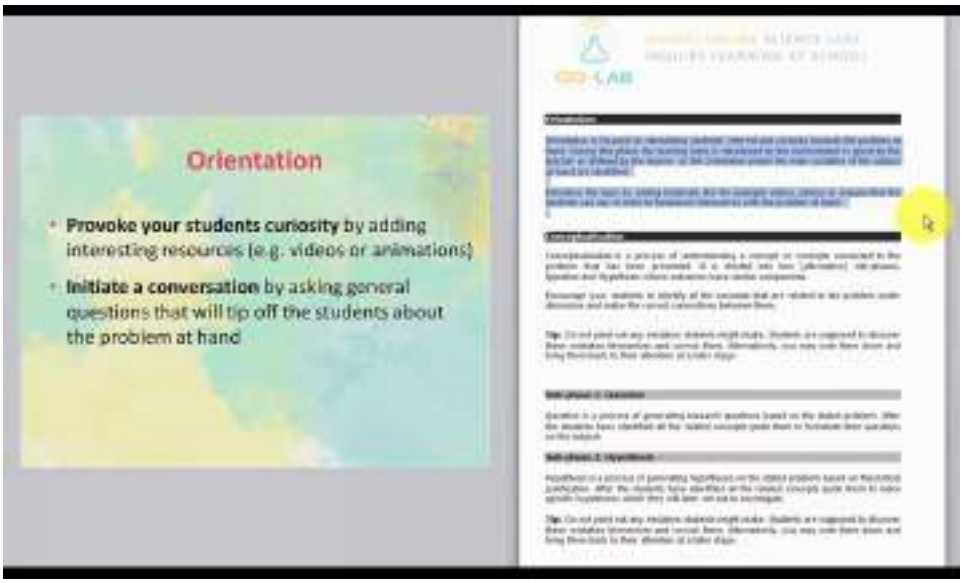

Figure 16: Go-Lab Portal video tutorial

2.5.3 Module 3: Exploring the Sun

Module 3 explains the participants how to create and implement in Go-Lab an exciting learning scenario for an astronomy class using the Sun4All scientific data archive and the SalsaJ tool. To this topic, a video lecture by Prof. João Fernandes (University of Coimbra) and a video tutorial by Rosa Doran (NUCLIO) are provided. Moreover, the module offers a video excursion (in three parts) to the Observatory of the University of Coimbra, demonstrating astronomic instruments beginning with those used in the middle ages and up to a modern spectroheliograph. The operation of the spectroheliograph and the process of taking and archiving pictures (which are available in Sun4All for teachers and students) are demonstrated.

In this module, the participants will be able to create their own activities using the represented tools and implement them in the ILSs.

The videos were created by the NUCLIO and IMC teams. Invited speakers: Prof. João Fernandes and Dr. Telma Esperança, University of Coimbra, Portugal.

Figure 17: Dr. Telma Esperança demonstrating the operation of a spectroheliograph

2.5.4 Module 4: Exploring galaxies

This module concentrates on the remote lab Faulkes Telescope and the virtual lab Galaxy Crash giving the participants an introduction to the Faulkes Telescope project and representing the use of the online labs. The module provides a video lecture (by Dr. Fraser Lewis, University of Cardiff) and three demo-videos demonstrating the interfaces of the labs, as well as an ILS implemented in the Go-Lab Portal. A text-script to the video lecture is available.

In this module, the course participants will be able to either use and adopt already existing ILSs or create their own using the authoring platform Graasp.

The videos were created by the University of Cardiff and IMC teams.

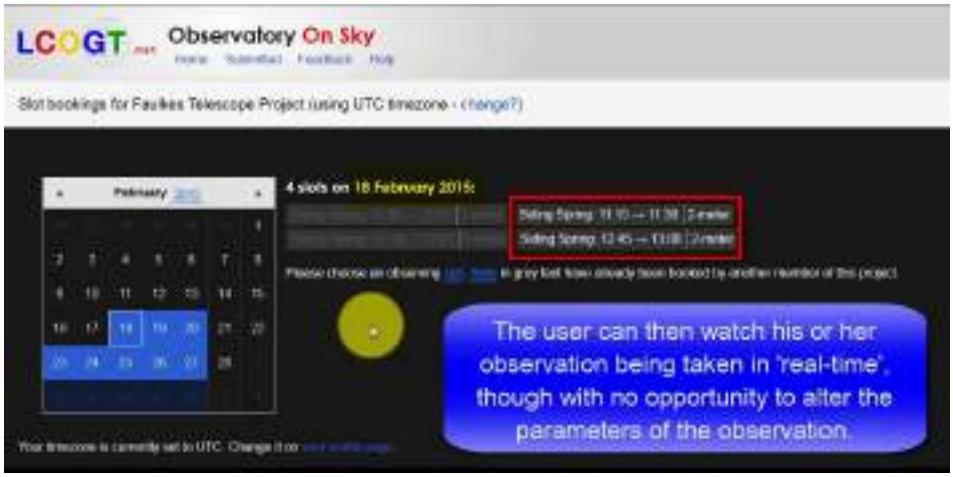

Figure 18: Demo-video demonstrating the web-interface the Faulkes Telescope

2.5.5 Module 5: Conservation of momentum

The last module of the online course gives the participants a detailed introduction to the HY.P.A.T.I.A online lab and represents two scenarios for its use in the classroom. The module contains three video lectures (with integrated screencasts) created by Prof. Christine Kourkoumelis and Dr. Sofia Chouridou (IASA). PowerPoint-scripts to the video lectures as well as step-by-step scenarios in the Go-Lab Portal are available.

In this module, the course participants will be able to either use and adopt already existing ILSs or create their own using the authoring platform Graasp.

The videos were created by the IASA and IMC teams.

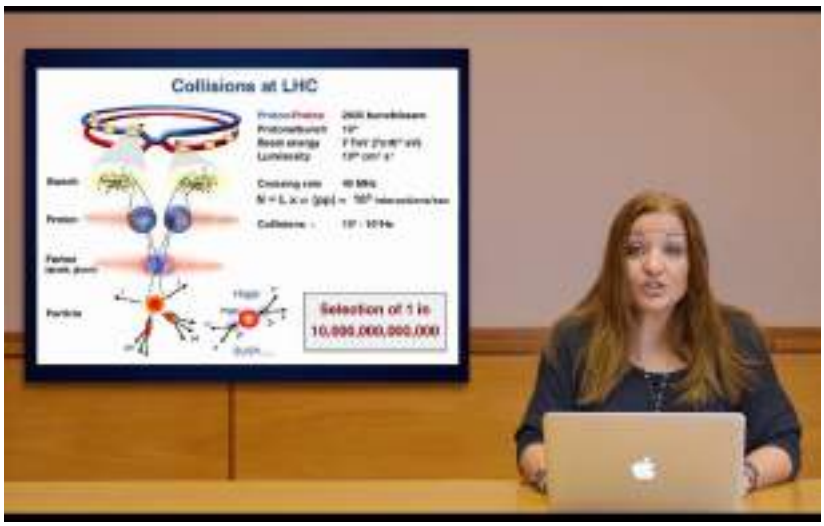

Figure 19: Dr. Sofia Chouridou explaining the "Z and Higgs bosons" scenario

2.5.6 Release preparation

Before the course will be launched at the OpenCourseWorld-platform, (https://www.opencourse-world.de, OCW), a test-run will be conducted at a demo-platform to allow the last quality check by the consortium members. During this phase, the course information will already be available at the OCW-platform and pre-registration to the course will be possible. The course will be promoted via all dissemination channels of Go-Lab. The course page on the project website is already available: http://www.go-lab-project.eu/mooc.

The IMC team has already started the test-run preparation. Finalized course materials were transferred to the demo-platform, structured to the course modules, and provided with descriptions and explanations. Figure 20 represents a screenshot of the online course user interface.

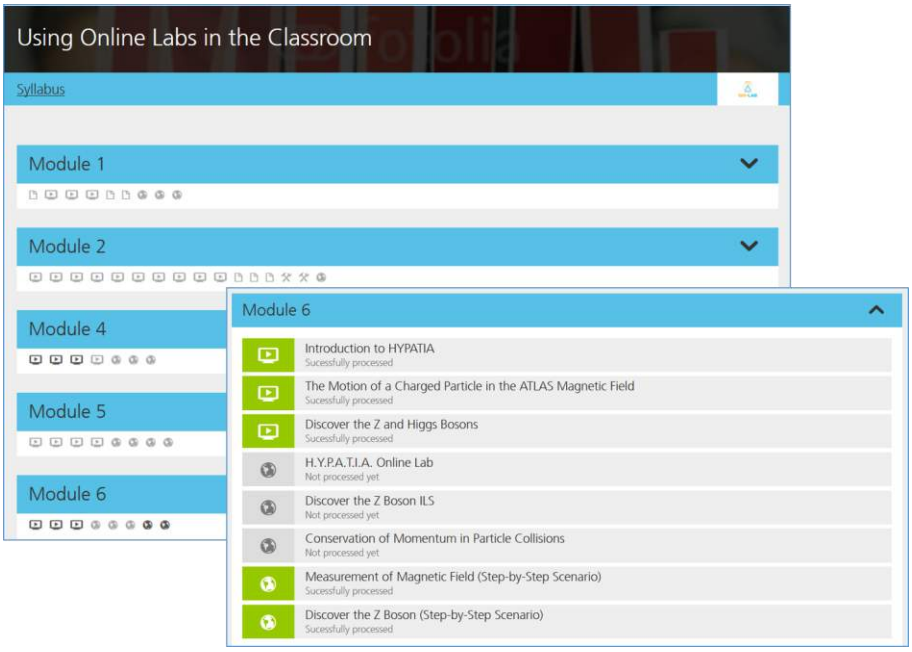

Figure 20: User interface of the OpenCourseWorld-platform

After the remaining course materials are finalized, the test-run can be started. The official course launch is planned for January 2016.

3 Exploitation Plan and Report

The Go-Lab project aims at introducing inquiry learning methods and tools in school education, providing access to online labs and supportive inquiry learning scaffolds via an integrated web portal, 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 goal, it is crucial to develop a viable business model and start implementing it already during the project time to generate revenue streams assuring sustainability of the Go-Lab product and services.

Such business model should consider needs and requirements of different customer segments, identify activities to be conducted after the project time and resources needed to perform these activities, define customer and supplier/partner relationship management activities, estimate future costs and plan revenue streams to cover these costs, as well as define a pricing and payment model. Furthermore, it is important to take a decision about the organization after the project time and the involvement of the consortium partners in the planned activities.

This section evolves the Sustainability and Exploitation Plan defined in the Deliverable D9.3 “Report of Dissemination and Exploitation Activities, Year 2 (M24)” and represents it in a form of Business Model Canvas (see Table 8 below). Furthermore, it documents the decisions taken by the consortium regarding the organization and activities after the project time. The section includes the results of market research conducted in the Year 3 and documents the progress of the Go-Lab exploitation activities.

This business model will be verified concerning its feasibility for the project members and acceptability for the target groups during the fourth project year and, thus, is a subject to change. The final exploitation plan and well as the first results of its implementation will be documented in the Deliverable D9.5 (Year 4).

3.1 Business Model Canvas

The Business Model Canvas (BMC) is a strategic management tool for developing and documenting business models. We decided to use this tool to work on the sustainability and exploitation plan for Go-Lab in order to develop this plan in a systematic way and to document all necessary aspects.

Table 8 shows the Business Model Canvas summarizing the main aspects of the Go-Lab business model (value proposition, customer segments, customer relationships, channels, key activities, key partners, key resources, cost structure, and revenue streams). The business model covers both components of the Go-Lab offer: (1) The Go-Lab Portal, including the Go-Lab Repository, ILS authoring platform, and Go-Lab Tutoring Platform, and (2) The user support (Go-Lab Academy), including international and national teacher training events and online support. Detailed explanations are provided in the sub-sections 3.1.1 to 3.1.8.

Table 8: Go-Lab Business Model Canvas

<table>
<tr>
<td rowspan="2">Key Partners

Key suppliers: providers of commercial and non-commercial online labs (universities, research institutions, research projects, private companies)

Activities:
- Prepare online labs for the integration in the Repository (metadata, translation, etc.)
- Host and maintain online labs

Key partners: dissemination partners targeting same stakeholder groups (e.g., research projects focusing on science teaching and innovative teaching methods and technologies)

Activities:
- Listing Go-Lab on the websites
- Promotion of Go-Lab news in online communication channels
- Jointly organized presence events</td>
<td>Key Activities

- Collecting customers' requirements on the new features, online labs, and apps to be integrated into the Portal
- Development, maintenance and update of the Go-Lab Portal;
- Integration of new online labs and inquiry learning applications
- Supplier relationship management
- Quality assurance
- Marketing and public relations
- Customer relationship management
- Sponsor relationship management
- Provision of teacher professional development training
- Provision of online expert tutoring services</td>
<td rowspan="2">Value Proposition

Value proposition:
- Find and use remote and virtual labs and inquiry learning scaffolds
- Access federated OERs filtered by the teacher communities
- Create customized Inquiry Learning Spaces (ILSs)
- Receive training and support in the implementation of this technology

Helps to solve/satisfy customer's problems/needs:
- Increase practice-orientation and relevance of science classes
- Provide tools for hands-on learning activities
- Increase students' motivation and performance
- Enable experiments which cannot be conducted in the classroom
- Personalize learning experience of the students
- Provide information on students' performance with learning analytics
- Consider data privacy issues

Product/service bundles:
- Go-Lab Portal, incl. Go-Lab Repository and Graasp, as well as online labs, inquiry apps, and ILSs
- Go-Lab Academy, incl. presence training for teachers and online tutoring and support</td>
<td rowspan="2">Customer Relationships

Our customers expect long-term relationship in terms of availability of product and services. Training in the implementation phase as well as support during the whole usage time are required.

The product and services (presence training, online tutoring) are already available for the science teachers.

Commercial version of the product (e.g., incl. commercial online labs) and online support for other target groups have not been introduced yet.

All customer relationship activities are integrated into the business model of Go-Lab and are an essential part of the services provided by Go-Lab Academy.

Channels

- Personal contact via professional associations and networks, professional development programs, and related initiatives and projects
- Target group specific conferences and events
- Online channels, such as informational portals, relevant websites, and social media
- Customer-to-customer recommendation</td>
<td rowspan="2">Customer Segments

Science teachers and school administrations (students as end-users). This is the most important target group of Go-Lab. The Go-Lab offered is created for and adopted to the needs of these stakeholders. The most significant revenues are expected to come from the training provided to science teachers and sponsored by the teacher professional development programs.

Individual customers: private tutors and students' parents (students as end-users). Educators providing private tutoring for students as well as students" parents wanting to assist their children can benefit from using Go-Lab. These customers will be able to access commercial online labs and receive online support at a charge.

Organizational customers: universities, vocational training organizations, online course providers (university students and lifelong learners as end-users). These stakeholders can benefit from integrating Go-Lab activities in their online and blended learning courses. The access to the commercial online labs and online support will be provided at a charge.</td>
</tr>
<tr>
<td>Key Resources

- Intellectual: software licenses (software developed in the project and software integrated into the Portal)
- Human: expertise needed to maintain the system, add new online labs, provide user support and teacher training, conduct marketing activities, manage software suppliers, perform quality control, etc.
- Financial: funding for school teachers from Ministries of Education and professional development programs (e.g., to finance teachers' participation in the teacher training)</td>
</tr>
</table>

Cost Structure	*Revenue Streams*

- Personnel costs
  • System maintenance, update and technical support
  • Provision of teacher professional development courses
  • Provision of online expert tutoring
  • Partner & supplier acquisition and management
  • Marketing and sales activities
- Hosting and maintenance of the Go-Lab Portal and website
- Fees to be paid to commercial online labs providers
- Promotional materials
 	
Personnel resources are the most cost-intensive resources Go-Lab needs to implement its business model. Provision of teacher training and online support contribute the significant part of these costs.
	The customers expect to receive a product which:
	- is technically more advanced than other free products on the market
	- is intuitive and can be used without support of technical staff on the customers' side
	- will bring teaching activities at a new level making the learning process more motivating and efficient
	- will differentiate the customer's organization from other educational providers
	- will save costs (e.g., compared to the use of real laboratory equipment)
	
	Furthermore, the customers expect to receive high-quality consultancy and support introducing them (or their staff) to the use of the product and assisting them during the whole usage time.
	
	Revenue streams:
	- Provision of teacher professional development training (customer segment: science teachers; funded by teacher professional development programs, e.g. Erasmus+). This revenue stream is expected to contribute the greatest part of the total income.
	- Provision of commercial online labs and expert tutoring (customer segments: individual and organizational customers. Provision for teachers is possible, if sponsored by Ministries of Education or other funding bodies).

3.1.1 Value proposition

3.1.1.1 What value do we deliver to the customer?

With the Go-Lab Portal the customer is able to:

- Find and use (a) lesson plans and activities, (b) remote and virtual labs and inquiry learning scaffolds (apps) suited for online training with inquiry-based learning activities, and (c) teachers and schools who are already using the service.
- Create customized Inquiry Learning Spaces (ILSs) containing these labs and apps as well as educational resources of the customer. The customer is able to decide about the structure of such spaces and their content. Thus, the ILSs support particular pedagogical scenarios of the customer.
- Receive training and support in the implementation of this new technology. Training refers to an integrated framework to facilitate the effective integration of the service to the school curriculum.

The use of online labs is not very widespread as yet, which means that we are delivering a new technology helping the customers to enrich their educational products (classroom activities, online courses, etc.) with the use of innovative tools.

Importantly, the learning environment and tools delivered by Go-Lab can be customized by the customer according to his/her teaching goals and lesson or course scenarios, as well as according to the needs of the students as end-users.

Finally, the online labs can be accessed from any computer with internet connection, which is very convenient for the end-users who can use the labs in the classroom or any time at home (e.g., if the labs are incorporated in an online course).

3.1.1.2 Which customers' needs are we satisfying? Which problems are we solving?

Currently, many educational programs (especially in school education) lack practice-orientation and the possibilities for students to gain hands-on experience with the subject of study. This results in difficulties with understanding the subject and lack of motivation to engage in studying science. The problem can be solved if offering inquiry-based learning activities enabling students to conduct experiments themselves and gather experience of doing science.

As not every experiment can be conducted in the classroom (e.g., due to security reasons), the use of online labs represents a worthy alternative or can even substitute a real experiment in case of unavailability of a physical laboratory or necessary equipment (which is the case in some rural schools). Students using online labs gain the same level of knowledge or a more advanced level of knowledge than students who learn in a real laboratory[47]. If well designed, scaffolds included, inquiry-based learning with online labs and simulations shows an advantage over expository instruction[48]. This means that the use of online labs increases students' performance in the class and improves learning outcomes.

Some teachers are very cautious in using modern educational technologies, as sometimes it is not possible to keep control over the students' learning activities and their results, if using a virtual learning environment. To overcome this barrier, Go-Lab provides a Learning Analytics engine (AngeLA) allowing educators to get an overview of the use of the inquiry learning tools and the learning progress of the students.

For individuals like private tutors and students' parents the use of online labs is important to improve student's understanding of the material and provide hands-on experience, as there is no

[47] de Jong, T., Linn, M.C., & Zacharia, Z.C. (2013). Physical and virtual laboratories in science and engineering education. *Science*, *340*, 305-308.

[48] de Jong, T. (2006). Computer simulations - Technological advances in inquiry learning. Science, 312, 532-533.

possibility for individuals to conduct (complicated) experiments using real laboratory equipment. The private tutors can benefit from using online labs offering benefits for the students compared to other tutors who do not use online labs. The students' parents can help their children to improve their performance at school and motivate them for studying science.

For online course providers, the use of online labs can significantly increase the value of the courses for the participants extending theoretical learning materials with online experiments and exercises. In this case, the customer can increase the number of online course participants and decrease the drop-out rate.

3.1.2 Customer segments

3.1.2.1 For which customer groups are we creating value?

The main target group of Go-Lab is *schools and science teachers* (as well as their students as end-users). With help of the Go-Lab Portal, science teachers can enrich their classroom activities with inquiry-based learning activities in order to help the students to better understand scientific phenomena. This target group is the focus customer segment of Go-Lab, as the Go-Lab Portal has been developed especially for them in order to bring science teaching in European schools at a new level.

As of October 2015, Go-Lab counts about 1,300 pilot schools, which means more than 1,400 teachers in Europe and beyond[49]. After the project time, Go-Lab plans to attract, train, and provide implementation support for 1,000 science teachers a year (teachers' participation in training will be financed by Erasmus+ programme – see section 3.1.7).

The second target group are *organizational educational providers*. These include universities and online course providers (e.g., organizations offering distance learning courses and MOOCs). This customer group can be interested in enriching their offer on presence, blended and online courses with online experiments. For universities this will help to extend existing courses with additional activities, which can be conducted by the students in the class, but also at home as an assignment. For online course providers, the use of online labs can even open a new niche on the market allowing them to provide inquiry-based online courses. Such courses can be interesting not only for learners from European countries, but also for learners from developing countries, in which the access to real laboratory equipment is quite limited.

According to the MOOC-list[50], there are about 1,140 MOOCs devoted to STEM-subjects and provided on different MOOC-platforms. However, there are only a few courses including the use of online labs by the participants: two physics courses at Coursera including the use of remote and virtual online labs; one course developed by UNED, Spain, including the use of VISIR online lab; and one course offered by the University of North Carolina at Chapel Hill, USA, including the use of a remote telescope[51]. Thus, there is a huge potential for enriching online courses available for university students and lifelong learners with the use of online labs.

The third customer group are individuals, for example *private tutors and students' parents*. Private tutors can increase the value of their services by using online labs together with their students. Parents can assist their children in doing homework and preparing for exams. Moreover, the use of online labs can make the learning process more interesting for talented children providing additional, and maybe more complicated, exercises. Moreover, Go-Lab seeks labs for younger kids and plans to adapt or create apps specifically for this age group.

[49] Teachers who participated in the pilot phases A and B and applied for phase C.
[50] MOOC-list: www.mooc-list.com
[51] Dikke, D., Faltin, N.: Go-Lab MOOC – An online course for teacher professional development in the field of inquiry-based science education. In: Proceedings of the 7th International Conference on Education and New Learning Technologies (EDULEARN 2015), 6-8 July, Barcelona, Spain. IATED 2015.

An exact estimation of the size of this target group appears to be quite difficult. However, according to our research, in Germany more than 2 billion Euro is spent for the private tutoring yearly. Every fourth student aged 13 to 15 and every fifth student aged 10 to 18 receives private tuition. More than 300 organizations provide tutoring services for students[52]. In Greece, more than 950 million Euro are spent yearly and "almost each student" receives private tuition[53]. In Austria, more than 100 million Euro are spent yearly for private tutoring; 265,000 students use these services[54]. As for other countries, in the UK every fourth student aged 11 to 16 receives private tutoring[55]; for Poland this number is estimated to 10% of all students[56]; in Switzerland every third student needs private tuition[57].

3.1.2.2 What bundles of products/services are we offering to each customer segment?

The Go-Lab offer basically consists of five main components:

- The Go-Lab Portal, including:
  - the Go-Lab Repository (www.golabz.eu) and Tutoring Platform (http://golabz.tutoring.eu) developed and hosted by IMC, and
  - the authoring and collaboration platform Graasp (http://graasp.eu) developed and hosted by EPFL.
- Online labs. Currently, only non-commercial online labs are listed in the Go-Lab Repository and are provided to the customers free of charge. It is planned to include also commercial online labs, which will be provided to the customers at a charge.
- Learning Analytics engine. Learning Analytics engine offers the users (teachers, instructors) a possibility to receive and analyze data regarding the use of the tools and learning progress of each student (basic functionality). An advanced functionality for group analysis can be developed to be provided to the customers at a charge.
- Expert tutoring/support. At the Go-Lab Tutoring Platform, the users can receive support from the Go-Lab consortium members and from "power-users" free of charge. After the project finishes, the expert support (from the consortium members) will become commercial, so one can book a video-session with an expert paying a fee. Peer-to-peer support will remain free.
- Teacher training. This service is already being provided to the customers and it will be provided after the project end. School teachers, as end-users of this service, do not pay for it themselves, but become funding from European teacher professional development programs and grants.

Table 9 (on the next page) summarizes which components are or will be provided to which customer segments[58].

[52] Source: http://www.deutschlandtest.de/nachhilfe/. Data as of 2014.
[53] Source: http://www.zeit.de/2012/18/C-Griechenland-Nachhilfe. Data as of 2012.
[54] Source: http://diepresse.com/home/bildung/schule/hoehereschulen/1259652/265000-Kinder-in-Oesterreich-brauchen-Nachhilfe. Data as of 2012.
[55] Source: http://www.telegraph.co.uk/finance/personalfinance/household-bills/10942791/Is-it-better-to-spend-on-school-fees-or-private-tuition.html. Data as of 2014.
[56] Source: http://tu-dresden.de/die_tu_dresden/fakultaeten/erzw/erzwibf/sp/forschung/ganztagsschule/FIBS.pdf, page 117. Data as of 2008.
[57] Source: http://www.tagesanzeiger.ch/schweiz/standard/Jeder-dritte-Schueler-braucht-Nachhilfe/story/13574426. Data as of 2014.
[58] In the Year 4, feasibility studies will be conducted to investigate how the proposed model can be applied in the real market. This refers to the provision of paid services to schools (some commercial labs will be included in the Go-Lab Repository, acceptance studies will be conducted), as well as provision of Go-Lab services to organizational educational providers (appropriate online labs have to be included in the Go-Lab Repository) and private tutors (promotion among these target group and acceptance studies).

Table 9: Go-Lab Product-Customer Matrix

Product/ service / Customer segment	Go-Lab Portal		Online labs		Learning Analytics**		Expert tutoring services ***	Teacher Training
	Repository and tutoring	Authoring and collaboration	Free	Paid*	Basic (individual analysis)	Advanced (group analysis)		
Schools (with science teachers as end-users)	free			paid/ sponsored	free	paid/ sponsored	paid/ sponsored	sponsored
Individual customers (private tutors for students, students' parents)	paid (with free demo-set and free trial time for the whole package)			paid	paid	-	paid	-
Organisational customers (universities, online course providers; instructors and course authors as end-users)	paid (with free demo-set and free trial time for the whole package)			paid	paid	paid	paid	-

* Paid online labs: pay-per-lab or subscription

**Learning Analytics: included in subscription

***Expert Tutoring: pay-per-hour

As it is demonstrated in the table, for the school teachers the main Go-Lab products and services will remain free of charge. Only additional (optional) product components and services (such as paid online labs, advanced learning analytics, and expert tutoring services) will be offered to this customer group at a commercial basis. This target group will be able to use online laboratories and the Go-Lab Portal, basic Learning Analytics functionalities (for individual student analysis), and receive expert support at a charge. The use of commercial components by schools can be sponsored, e.g. by the Ministries of Education. Teachers' participation in training will be sponsored by teacher professional development programmes.

Individual customers (private tutors, parents) will be able to use the Go-Lab Portal, online labs, basic Learning Analytics functionalities (for individual student analysis), and receive expert support at a charge. Here, subscription and pay-per-lab models can be applied.

For the organizational customers, the use of pedagogically and technically advanced commercial online labs, suitable for university curriculum and adult training, will be offered. Also, advanced Learning Analytics functionalities supporting group analysis (like analyzing progress of a group of students, receiving alerts where instructor's support is needed and recommendations of tools that can be used) is important for this target group. Finally, expert tutoring will be offered at a charge in order to assist instructors in creating truly professional Inquiry Learning Spaces.

The pricing model is described in detail in the section 3.1.7.

3.1.3 Activities after the project time

After the Go-Lab project time (but also before the project finishes, starting from now, in order to prepare the exploitation of the Go-Lab product and services), the following key activities are required:

- Development, maintenance and update of the Go-Lab Portal;

- Integration and maintenance of new, up-to-date online labs and inquiry learning applications (which has to be done continuously also after the project end in order to keep the Portal attractive for the customers);
- Adapt the platforms for collaborative learning and create apps that support this;
- Adapt the platforms to support alternative learning modalities (social and personal learning, MOOCs, …)
- Prepare apps that help students acquire 21st century skills;
- Collecting customers' requirements on the new features, online labs, and apps to be integrated into the Portal, and implementation of these requirements;
- Supplier relationship management (attracting and managing project external online lab providers);
- Quality assurance (correspondence of external software to the quality and technical requirements of Go-Lab);
- Marketing and public relations activities (conducting market research, increasing awareness about Go-Lab and its benefits and attracting customers, managing promotion and sales partners, etc.);
- Customer relationship management (pre-sales and sales activities, after-sales support, information, communication, etc.);
- Sponsor relationship management (informing and attracting governmental and industrial sponsors, establishing and maintaining long-term cooperation);
- Provision of teacher professional development training in form of presence workshops taking place in different European countries;
- Provision of online expert tutoring services to teachers and other target groups.

Although the Go-Lab portfolio contains two main directions of activity, namely (1) provision of the Go-Lab Portal and online labs, and (2) provision of the teacher training and user support, the whole value chain includes also activities connected with managing multiple groups of stakeholders (suppliers, cooperation and sales partners, governmental and non-governmental sponsors, different groups of customers) as well as marketing and sales efforts which have to be taken into account while creating the business model.

3.1.4 Partners, suppliers, sponsors

3.1.4.1 Online lab providers

External online lab providers play a key role in the development of the Go-Lab Portal contributing their online labs to the Go-Lab federation of online labs. These partners are, for example, PhET Interactive Simulations (https://phet.colorado.edu), USA, University of St. Andrews (http://www.st-andrews.ac.uk), UK, CREATE Lab of New York University (http://create.nyu.edu/mm), USA, Department of Biological Sciences of East Tennessee State University (http://www.etsu.edu/cas/biology), USA, RemLabNet (http://www.remlabnet.eu), Czech Republic, and many others. These partners are contributors of the non-commercial labs, which can be used by the teachers free of charge. The Go-Lab federation of online labs currently includes 161 labs[59] (contributed by the consortium members and external providers) and is continuously growing.

Currently, the Go-Lab project is looking for commercial partners who will be interested to contribute their online labs to the Go-Lab Portal in order to provide them to the customers at a charge (subscription model or pay-per-lab; see section 3.1.7 for details).

Different types of online lab suppliers can be considered:

[59] As of 28th October 2015

- Online lab developers providing ready-to-use labs that can be integrated into the Go-Lab Portal and correspond to its technical and quality requirements;
- Online lab providers investing in the development of new online labs (also on demand of customers) that can be integrated into the Go-Lab Portal;
- Online lab owners who are interested in the development and provision of commercial online labs.

The following list represents several potential cooperation partners (organization who have already suggested cooperation to Go-Lab or who were identified by Go-Lab in a research):

- Labster (https://www.labster.com): Labster is a commercial provider of online labs, which are based on 3D virtual reality. Although the format of these labs is not compatible with Go-Lab ILSs, these technically advanced labs can be offered through the Go-Lab Repository as a complementing product. Labster is interested in offering their labs through the Go-Lab Portal.
- Bareket Observatory (http://www.bareket-astro.com/en.htm): Bareket Observatory is based in Israel and is interested in providing access to their remote telescope via Go-Lab (at a charge) and creating inquiry learning activities in form of ILSs including the use of the remote telescope and educational resources of the observatory.
- Explorelearning (http://www.explorelearning.com/): Explorelearning provides sophisticated online simulations (called "Gizmos") for STEM subjects. Over 400 Gizmos for grades 3 to 12 are available. These simulations could be integrated into the Go-Lab Portal and used in the ILSs.
- Late Nite Labs (http://latenitelabs.com): this provider offers commercial virtual labs in biology, chemistry, and physics, which could be integrated in the Go-Lab Portal.
- Edumedia (https://www.edumedia-sciences.com): Edumedia offers a big number of interactive STEM educational resources and simulations, which could be suitable for the Go-Lab Portal and ILSs.

After the project end, Go-Lab will continue including new online labs and apps into the Portal in order to keep it up-to-date and attractive for the customers. Go-Lab also has a facility for lab owners to upload their labs themselves (in this case, the labs are published after the quality control has been performed).

3.1.4.2 Dissemination partners

In order to promote Go-Lab among school teachers, Go-Lab cooperates with other European projects and initiatives targeting science teachers and providing teacher training (such as Discover the Cosmos, Open Discovery Space, Inspiring Science, Scientix, inGenious, Future Classroom Lab, eTwinning, and others). In scope of this dissemination cooperation, the projects mutually promote each other on the own websites and in the social media channels. Joint workshops and events for teachers are organized (see section 2.4.2). Go-Lab is continuously looking for new dissemination and training partners aiming to increase its network and establish new channels to communicate with teachers.

3.1.4.3 Teacher trainers

In scope of the Go-Lab project, the focus is set on the provision of professional development opportunities to teachers. This is organized in the framework of an extended community development support mechanism. This process (involvement in a community of practice) is considered the core node of the professional development programme, as teachers have the chance to share experiences and best practices and develop their competences in the design of student-centered educational activities.

The Go-Lab consortium has tested this approach in numerous occasions (more than 50 national training and 6 international training courses have been organized, including three Summer Schools and three international events organized by UT, NUCLIO and ESA in the Netherlands and UK), while the community currently includes more than 1,500 teachers.

In the Year 4, the proposed scheme will be expanded to the Go-Lab Academy that will engage teacher trainers currently active in Go-Lab, but also other trainers working for related projects and initiatives, in order to offer teacher training services after the end of the project. The Go-Lab Academy will collaborate with national training centers and national educational authorities in order to provide both international and local training courses and support to the Go-Lab users.

3.1.4.4 Funding authorities

Organizing its teacher training events, the Go-Lab project cooperates with several teacher professional development programs (like Comenius/Grundtvig, Erasmus+, and Galileo Teacher Training Program). A mechanism to support the participation of the Go-Lab teachers to ERASMUS+ mobility actions has been developed, including the involvement of the Go-Lab schools in the KA1 Action of the programme. This mechanism will allow financing teachers' participation in the training also after the end of the Go-Lab project. The proposed funding scheme is described in detail in section 3.1.7.3.

Moreover, the Go-Lab consortium is working on the establishment of cooperation with the Ministries of Education and National Agencies (responsible for teacher professional development) in European countries in order to receive their commitment to support Go-Lab also after the project end. Detailed information on the current progress can be found in the section 3.3.3.

3.1.5 Competitor analysis

There is a large number of websites and portals listing and providing access to online laboratories and other STEM teaching and learning resources, such as animations, simulations, games, worksheets, quizzes, and so on. Such websites represent collections of tools, which, in most cases, can be filtered by grade or students' age, subject domain and/or tool provider. These collections can offer from several up to hundreds tools (like, for example, Merlot Physics Portal, http://physics.merlot.org). However, these portals do not provide authoring facilities allowing users (in most cases teachers and university staff) combining different apps and creating structured virtual learning spaces.

Some examples are represented in the table below.

Table 10: Portals for STEM learning resources

Provider	Link	Types of resources	Features
Merlot Physics Portal	http://physics.merlot.org	Animations, presentations, online courses, quizzes, reference materials, collections, and many others	Filtering by category (subject domain), material type, reviews, mobile filters. **Go-Lab is listed in this portal*
Phet interactive simulations	https://phet.colorado.edu	HTML5-, Java-, Flash-based online labs to be used online or downloaded.	Filtering by subject domain, grade level, device, etc. **An external partner of Go-Lab*
Concord Consortium	http://concord.org	Online labs (browser-based and for download).	Filtering by subject domain, grade level and resource type. **An external partner of Go-Lab*
Virtual Labs in the CSU	http://teachingcommons.cdl.edu	Virtual online labs.	Categorization by subject domain and provider.

Provider	Link	Types of resources	Features
Online Labs In	http://online-labs.in	Virtual online labs.	Categorization by subject domain.
McGraw Hill Education	http://goo.gl/BNXZx5	Small collection of free virtual labs.	Each virtual lab is provided with step-by-step instructions (Orientation – Hypothesis - Experiment Setup – Data gathering). Although the concept is similar to Go-Lab, no authoring is possible.
Science Zone	http://goo.gl/ZAnPxa	A large number of interactive science games and activities.	Categorization by subject domain.

On the other hand, web-based portals can be found, offering teachers a possibility to create own lesson templates or worksheets combining different activities and resources. However, these portals usually do not contain online labs and allow creating templates using less interactive media types, like images, animations, and quizzes.

For example, in the SoftSchools portal (http://www.softschools.com) teachers can find various games for math and science learning, flashcards, and quizzes. These can be organized by the teacher in worksheets suitable for particular classroom activities. Another example is the Learning.com portal (http://www.learning.com) featuring web apps, games and puzzles, and allowing teachers to assemble selected tools in own lessons, learning units, and courses.

As a provider for online labs and inquiry learning scaffolds, authoring tools for teachers, and teacher training and support, Go-Lab is a unique full-service provider for tools and services in the field of science teaching at schools.

During our research, we found only one provider (WISE, https://wise.berkeley.edu), which looked similar to Go-Lab. WISE offers an authoring infrastructure allowing teachers to combine different learning resources (like PhET virtual labs, inquiry learning apps, text pages, discussions, and others) and organize them in inquiry learning projects. Each project contains multiple activities which, in their turn, contain learning resources and tools that can be selected from the list or uploaded by the teacher. Such project can be structured according to the Predict-Observe-Explain-Reflect cycle. In addition, the projects can be viewed, copied and reused by other teachers.

In contrast to Go-Lab, no learning object repository to search and preview online labs and tools are available. Although there are multiple types of tools and content that can be added to a project, only a limited number of online labs (PhET simulations) is available. Regarding the user support, a Quick Start Guide (in text form) and an FAQ-page are available. No video guidelines, webinars, or training are offered. The platform is available in multiple languages.

Thus, currently Go-Lab is the only non-commercial provider on the market targeting school teachers and offering a big variety of online labs, authoring facilities for teachers, as well as training and (online) support services.

3.1.6 Resources & cost estimation

The costs for the Go-Lab Portal development and its provision to the customers during the project time are financed from the Go-Lab project budget. The estimated costs that will arise after the project end and have to be covered by the revenues from the exploitation activities are summarized in the Table below[60].

[60] Estimation by the project partners UT, EA, EPFL, IMC

Table 11: Estimated costs after the project time

Cost	Partner	Amount/year	Sum	Comments
Technical infrastructure				
Hosting and maintenance of the Go-Lab Portal (as well as associated loosely coupled services). Excluding personnel costs.		1000 €	1000 €	Incl. hosting, virtual server, and ten ".eu" web domains
Fees to be paid to commercial online lab providers		-	-	The amount depends on agreements that will be met
Marketing activities				
Travel costs & participation fees		9.000 €	9.500 €	2 events à 1,500€ (large conferences) + 8 events à 750€ (workshops, etc.)
Promotional materials		500 €		Printing flyers, brochures, etc.
Personnel Costs				
System maintenance, update, and technical user support	UT	25.000 €	82.000 €	25% position (apps)
	EPFL	25.000 €		25% position (Graasp.eu)
	IMC	32.000 €		50% position (Golabz.eu)
Sponsor, partner, supplier acquisition and management	UT	25.000 €	66.000 €	25% position
	EPFL	25.000 €		25% position
	IMC	16.000 €		25% position
Marketing and sales activities	UT	25.000 €	57.000 €	25% position
	EA	32.000 €		50% position
Teacher training development and provision[61]	EA	64.000 €	208.000 €	100% position
	Trainers*	144.000 €		Depending on the number of hours. On average 75€ an hour. Planned: 40 courses a year à 6 days
Expert tutoring provision	Trainers*	30.000 €	30.000 €	Depending on the number of hours. On average 75€ an hour. Planned: ten 1-hour sessions a week
SUM (minimum estimated costs)			**453.500 €**	Excluding fees for online lab providers

*Trainers: Go-Lab National Coordinators and external trainers

In order to manage activities and distribute budget after the project time, it is planned to found a Go-Lab Association, which will first include UT, EA, EPFL, and IMC. Other consortium partners will contribute to the Go-Lab activities (e.g., developing online labs or providing teacher training) and will be paid on a contract basis. For more information please see Section 3.2.

[61] The estimation is based on the average costs of teacher training provision by EA (costs per hour, travel costs for trainers). The venue (conference room and technical support) is usually offered for free by the hotel, where participants are staying. Alternatively, training can be conducted by a partner institution.

3.1.7 Revenue streams

3.1.7.1 For what value are our customers willing to pay?

The customers (schools, educational providers) expect to receive a product which:

(1) is technically more advanced than other free products on the market (e.g., commercial online labs compared to free online labs; more effective and pedagogically advanced than traditional MOOCs, or advanced authoring facilities compared to a simple list of STEM resources);
(2) is intuitive and can be used by teachers and instructors without support of technical staff on the customers' side;
(3) will bring their teaching activities at a new level making the learning process more motivating and efficient for the students;
(4) will differentiate the customer's organization from other educational providers who do not use such product;
(5) will save costs (e.g., compared to the use of real laboratory equipment).

Furthermore, the customers expect to receive high-quality consultancy and support introducing them (or their staff) to the use of the product and assisting them during the whole usage time.

3.1.7.2 Revenues from the Go-Lab Portal

The Go-Lab product components (Repository for online labs and inquiry learning apps, authoring platform for creation of Inquiry Learning Spaces, Tutoring Platform for peer-to-peer tutoring, the use of online labs and learning analytics engine) will be available in two modes:

- Subscription: will be available for organizational customers (schools, educational providers) and individual customers (private tutors, parents);
- Pay-per-lab: will be available in combination with first-level subscription for individual customers.

Expert tutoring services will be available in pay-per-hour mode for organizational and individual customers, or as a part of subscription for schools.

The subscription prices will differentiate depending on customer segment and product components included in the subscription. For example, the use of the Go-Lab Portal interfaces, non-commercial online labs, and basic learning analytics functions will be available free of charge for schools, but the same combination of components will require subscription for other educational providers. Another example, for individual customers, three subscription levels will be offered, including different product components.

Table 12 (on the next page) summarizes the pricing model of Go-Lab.

The prices for different target groups will be defined after some surveys, as well as acceptance and sensitivity studies are conducted.

The minimum price for one tutoring-hour will be around 90€ (based on the estimated costs of 75€ per hour). Go-Lab plans to provide ten tutoring-hours a week, which means (by the approximate number of 40 weeks a year) the **revenue of 36,000€ a year**.

In order to implement the proposed model, an extra layer of technical implementation will be needed to provide secured authentication system, as well as booking and payment system. In the Year 4 it will be investigated how such mechanisms can be implemented and in which extensive these should be available in the Go-Lab Portal or on the site of a commercial online lab provider.

Table 12: Go-Lab pricing model

<table>
<tr><td rowspan="2">Product/ service

Customer segment</td><td colspan="2">Go-Lab Portal</td><td colspan="2">Online labs and ILSs (as OERs)</td><td colspan="2">Learning Analytics</td><td rowspan="2">Expert tutoring services</td></tr>
<tr><td>Repository and turoring</td><td>Authoring and collaboration</td><td>Non-commercial</td><td>Com-mercial**</td><td>Basic (individual analysis)</td><td>Advanced (group analysis)</td></tr>
<tr><td rowspan="2">Schools (with science teachers as end-users)</td><td colspan="3">free</td><td>-</td><td>free</td><td>-</td><td rowspan="2">Pay-per-hour
or fixed number of hours included in subscription</td></tr>
<tr><td colspan="6">Subscription
Price level 1</td></tr>
<tr><td rowspan="3">Individual customers (private tutors for students, students' parents)</td><td colspan="3">Subscription
Price level 2a*</td><td>-</td><td>-</td><td>-</td><td rowspan="3">Pay-per-hour
1 hour included for new subscribers</td></tr>
<tr><td colspan="4">Subscription Price level 2a +
Pay-per-lab</td><td>-</td><td>-</td></tr>
<tr><td colspan="5">Subscription
Price level 2b</td><td>-</td></tr>
<tr><td rowspan="2">Organisational customers (universities, vocational training organisations, online course providers; instructors and course authors as end-users)</td><td colspan="3">Subscription
Price level 3a*</td><td>-</td><td>Subscription Price level 3a*</td><td>-</td><td rowspan="2">Pay-per-hour
1 hour per user included for new subscribers</td></tr>
<tr><td colspan="6">Subscription
Price level 3b</td></tr>
</table>

* A demo-set of selected online labs and functionalities available for free for unlimited time. Free use of the whole package in the first two months.

** Free demo-versions available

3.1.7.3 Revenues from the Go-Lab Academy

Another branch of Go-Lab business model focuses on the training and support for science teachers, as well as school and instructional leaders from all over Europe developing innovative scenarios and projects using Go-Lab tools and resources. This service will be provided by the Go-Lab Academy and will include webinars, online tutoring sessions, 2 to 6 day long presence courses, an online course, as well as an access to the Go-Lab Tool Box (including a series of guidelines, manuals, videos, scenarios of practice, tools and showcases from numerous Go-Lab pilot schools).

Currently, Go-Lab serves more than 1,300 schools (1,400 teachers) from 15 European countries. Since 2013, a full six-day course is offered to teachers in Greece, UK, and the Netherlands. Shorter versions of the course are offered to teachers in different European countries. An online version of the course is currently in the development. Go-Lab has established an innovative mechanism to engage regularly with schools in order to support their development by offering customized courses supporting specific needs of science teachers.

The Go-Lab Academy and its National Coordinators responsible for different European countries together with the technical team of Go-Lab can offer numerous professional development opportunities at local, national and international level for the whole period of the Erasmus+ Programme (2014-2020) and beyond it. The cooperation with Erasmus+ is already established. After the Go-Lab project end, we plan to provide four six-days courses with 25 participants a year in at least

10 European countries, thus, offering training to 1,000 teachers a year. The price of the course per person per day can be set at 70 Euro (in addition to 130€ costs per person per day; both costs and fee are funded by Erasmus+). The total **revenue will be 420,000 Euro a year**.

3.1.8 Customer Relationship Management

3.1.8.1 What type of relationship do the customers expect us to establish and maintain?

The school teachers expect that we provide training and support them in the application of new teaching methods and tools (not only at the implementation phase, but also during the actual use of the product). They also expect that their feedback has influence on the development of the product and their requirements are considered.

Large educational providers most probably expect to develop a partnership relationship having a contact person within the Go-Lab consortium available for questions and support. Special offers in terms of prices might be expected.

Small educational providers, private tutors and parents might have similar expectations as the school teachers, namely receiving training at the implementation phase and support while using the product.

3.1.8.2 Through which channels do our customers want to be reached?

The school teachers and directors can be best reached through school networks, professional associations, and professional development programs. Teacher conferences also offer favorable opportunities to meet teachers and to attract their attention. After the first contact is established, the teachers can also be reached via online teacher communities and e-mail.

The decision makers from universities (e.g., professors, institution directors) and other educational institutions can be addressed personally (direct contact) as well as at scientific conferences and meetings. Research journals and newsletters from professional organizations widespread in scientific communities are also good channels to attract attention.

Private tutors (as well as “afternoon schools”) can be reached through professional associations as well as online marketplaces where they place their tutoring offers. But the best way to convince them is probably a recommendation of another tutor or school teacher. Thus, opinion leaders play an important role for this target group.

Students’ parents can be best addressed by the teachers, private tutors, or other parents who can advise them to use software tools to help their children with study. Further, online market places selling school books (e.g., Amazon), learning software and content (e.g., Sofatutor), as well as computer games for children (where children can notice the advertisement) can be suitable channels. Some parents may also read journals about school education and new tools for children.

3.1.8.3 How are we reaching the customers now?

The Go-Lab project does not practice “cold acquisition”, as this is not a right way to get our potential customers on board. In most cases, those teachers are contacted who already participate in other innovative initiatives and have an active contact to a professional network. This strategy has already proven its efficiency, as we already have more than 1,500 teachers from at least 15 European countries participating in Go-Lab pilot activities and training. Also, recommendation from one teacher to another in scope of everyday communication works well.

The communication with the school teachers is coordinated by the WP6. After the first contact has taken place, teachers become involved in Go-Lab pilot activities including workshops and training in different formats. Also, the teachers participate in participatory design workshops (organized by WP3) aiming at collecting users’ requirements and feedback and incorporating them

into the product development roadmap (after evaluation and prioritization). Online support in form of tutoring sessions and in some cases via e-mail is available.

The other target groups has not been contacted yet, as we are now working on establishing commercial services which can be offered to them. Our next step is to conduct acceptance studies with the target group representatives in order to find out in which product components they are interested, how and how much they would be willing to pay for them, and through which channels these components should be offered and delivered.

3.2 Organization after the project time

In order to keep the project results (Go-Lab Portal and Go-Lab Academy) sustainable after the project end, it is important for Go-Lab to:

(1) Create an organizational entity which will exist after the project end and unite Go-Lab consortium members responsible for provision of Go-Lab products and services to the target groups;
(2) Assure the availability of funding (e.g., from Ministries of Education, National Agencies, teacher professional development programmes, European research grants, industrial sponsors, etc.) to update and maintain the Go-Lab Portal and provide teacher training;
(3) Assure successful marketing of commercial products and services in order to cover the costs of key activities, particularly where the funding is not available;
(4) Assure that the Go-Lab Portal is maintained and contains up-to-date free and commercial online labs corresponding to the quality standards of Go-Lab and expectations of the customers;
(5) Keep conducting marketing, sales, implementation, and user support activities in order to increase overall awareness about Go-Lab as well as the number of non-commercial and commercial customers.

The following sections describe how these activities will be organized after the project time.

3.2.1 Organizational form

Already before the end of the Go-Lab project, key consortium members responsible for the provision of the product and services to the customers (UT, EA, EPFL, and IMC) will found an association which will exist after the project end. This initial set of key partners may be extended with other interested and qualified project partners.

The aims of this association are to:

(1) Maintain the Go-Lab Portal, including online labs and inquiry learning applications;
(2) Populate the Go-Lab Portal with new online labs created by the association members and external providers;
(3) Conduct teacher training and user support activities;
(4) Conduct partner and customer relationship management activities;
(5) Manage distribution of funding and revenues among participating stakeholders.

The association members will contribute intellectual and personnel resources to the association and finance their costs from funding and revenues. Other participating stakeholders (online lab providers, teachers trainers, sales partners, etc.) will be handled on a contract basis.

The Go-Lab consortium follows a low-risk approach starting with a non-profit association and aiming at founding a start-up or a new business area within an existing commercial organization after the success of the model has been proved.

3.2.2 Partners' responsibilities

The Go-Lab consortium involves 18 organizations, each contributing to the creation and implementation of the Go-Lab product and services. Importantly, the consortium partners come from different European countries, which allows Go-Lab to be represented for its stakeholders on site. Although only four partners will enter the new Go-Lab Association, other consortium members will contribute to the promotion, implementation, and support working on a contract basis. Those consortium members responsible for the technical tasks will contribute to the development of new online laboratories also working at a contract.

The following table summarizes current activities of the consortium members as well as their contributions after the project end.

Table 13: Partners' responsibilities

Nr.	Name	Country	Key activities during the project	Activities after the project
1	University Twente	Netherlands	Project coordination, pedagogical framework, online lab and app development, National Coordinator in the Netherlands	Development and maintenance of online labs and apps; teacher training in the Netherlands; user support (Association member)
2	Ellinogermaniki Agogi Scholi Panagea Savva AE	Greece	Coordination of implementation and teacher training; National Coordinator in Greece, Bulgaria, Romania; pedagogical framework	Collaboration with Ministries of Education and National Agencies; Teacher training all over Europe; user support (Association member)
3	École Polytechnique Fédérale de Lausanne	Switzerland	Go-Lab Portal development	Go-Lab Portal maintenance and update; user support (Association member)
4	EUN Partnership AISBL	Belgium	Coordination of implementation and evaluation; National Coordinator in Belgium, Italy, Poland	Collaboration with Ministries of Education and National Agencies; teacher training all over Europe (Contract)
5	IMC AG	Germany	Go-Lab Portal development, public relations, marketing, exploitation	Go-Lab Portal maintenance and update; user support (Association member)
6	Universidad Nacional de Educación a Distancia	Spain	Online lab development	Online lab development (Contract)
7	University of Leicester	United Kingdom	Participatory design	Teacher training in UK (Contract)
8	University of Cyprus	Cyprus	National Coordinator in Cyprus	Teacher training in Cyprus (Contract)
9	Universität Duisburg-Essen	Germany	Online lab development, National Coordinator in Germany	Online lab development, teacher training in Germany (Contract)

Nr.	Name	Country	Key activities during the project	Activities after the project
10	Centre for Research and Technology Hellas	Greece	Pedagogical framework	Online lab development (Contract)
11	Universidad de la Iglesia de Deusto	Spain	Online lab development, National Coordinator in Spain	Online lab development, teacher training in Spain (Contract)
12	Fachhochschule Kärnten – Gemeinnützige Privatstiftung	Austria	Online lab development, National Coordinator in Austria	Online lab development, teacher training in Austria (Contract)
13	Tartu Ulikool	Estonia	National Coordinator in Estonia	Teacher training in Estonia (Contract)
14	European Organization for Nuclear Research	Switzerland	Online lab development, National Coordinator in Switzerland	Online lab development, teacher training in Switzerland (Contract)
15	European Space Agency	France	Online lab development	Online lab development (Contract)
16	Cardiff University	United Kingdom	Online lab development, National Coordinator in UK	Online lab development, teacher training in UK (Contract)
17	Institute of Accelerating Systems and Applications	Greece	Online lab development	Online lab development (Contract)
18	Núcleo Interactivo de Astronomia	Portugal	National Coordinator in Portugal	Teacher training in Portugal (Contract)

Besides Go-Lab consortium members, other online lab providers and teacher trainers can be involved on a contract basis.

3.2.3 Funding acquisition

Already during the project time, Go-Lab consortium partners are actively involved in promoting Go-Lab among Ministries of Education (MoE) in European countries and writing proposals for projects aiming at further developing Go-Lab technology, implementation, and piloting (see section 3.3.2 for details). After the project time, members of the Go-Lab Association will continue activities to acquire funding from MoE, teacher professional development programmes, as well as research and innovation programmes in order to assure Go-Lab sustainability in a long-term perspective. The funding will be used to continuously develop and update technical infrastructure according to the newest technological and user requirements, and to attract and train new teachers in using Go-Lab.

3.2.4 Diversification and versatility

To align with the FP7 EU priorities and for an optimal use of the finite resources, Go-Lab has focused on secondary STEM education. The platforms and the resources developed in the project

are versatile enough to be extended to cover broader application domains and stakeholders communities. As a consequence, the partners will focus as described above to sustain Go-Lab as such, but will also consider alternative paths to offer the platforms and the resources as integrated sets or as individual services. Already envisioned diversification frameworks include:

- Blended collaborative learning activities
- Social and personal learning
- cMOOCs
- Support for entrepreneurship and creativity
- Support for communities of practice
- Support for professional learning and agile knowledge management (sponsorship has already been secured and invested to exploit Graasp in NGOs)
- Smart classroom activities

Further diversification frameworks will be investigated and developed in the course of exploitation activities during and after the project time.

3.2.5 Customer acquisition

After the project time, the Go-Lab Association members and partners working on a contract basis will provide training and support to existing and new members of the Go-Lab community. Potential Go-Lab teachers will be reached via teacher professional development programmes and related project they participate in, via professional networks, as well as using online dissemination channels. As the number of participating teachers will reach more than 2,000 teachers by the end of the project, their recommendations to the colleagues will play an essential role. The Go-Lab Academy will play a key role in coordinating teacher acquisition, training, and support, as well as in disseminating relevant information among this target group.

3.2.6 Distribution of revenues

The Go-Lab Association will manage the incomes generated by Go-Lab activities and distribute them among the involved parties, which include:

- Go-Lab Association members
- Go-Lab consortium members working on contract basis
- Teacher trainers conducting Go-Lab workshops
- Providers of commercial online labs

The revenues will cover system maintenance and update costs, personnel costs (technical team, teacher trainers, etc.), marketing costs, and fees paid to commercial online labs providers. The estimated costs are represented in the Table 11 (section 3.1.6).

3.3 Report on exploitation activities

3.3.1 Community building & support

One of the most important factors for the sustainability of the Go-Lab project results is the availability of a community of teachers, which can exist after the project time with a minimal support from the project consortium. In order to make this possible, Go-Lab launched the Go-Lab Tutoring Platform, a platform hosting online teacher community and giving teachers the possibility to receive support on any Go-Lab related topics and provide such support, as a tutor, to other community members. The Tutoring Platform and its use are described in more detail in the Deliverable D6.5 “Report on development of the virtual Go-Lab user community - V1” (M36). This section represents joint efforts of WP6 and WP9 aiming at creation and support of the online teacher community.

Since the Tutoring Platform has been launched, it has been promoted through all Go-Lab dissemination channels aiming to attract teachers currently using Go-Lab social media groups for collaboration. Currently, the Tutoring Platform counts 156 users[62]. In the Year 3, four webinars were conducted by the consortium members using the platform (these are documented in the Deliverable D6.5 "Report on development of the virtual Go-Lab user community - V1" (M36)). Furthermore, four interviews with the Go-Lab pilot teachers were organized. The recordings of these interviews are available on the Go-Lab YouTube channel[63]. Finally, a teacher scheduled a tutoring session and was assisted by the Go-Lab team in conducting this session for other teachers. The recording is also available on YouTube[64].

A significant result of the WP6-WP9 cooperation is the Go-Lab Support page (http://www.go-labz.eu/support) and its content, providing different kinds of resources about Go-Lab, such as video tutorials, tips & tricks, questions & answers, etc. From its launch on June 10th, the Support page counts 767 unique page views[65]. More detailed information can be found in the Deliverable D6.6 "Go-Lab user communities support framework and guidelines" (M36).

In the Year 4, Go-Lab plans to promote the whole package of teacher and community services (including teacher training courses, contests, summer schools, online courses, Tutoring Platform, supportive materials, etc.) under the "Go-Lab Academy" brand, which will remain sustainable after the project time. While the academy will have its own website (http://golab.ea.gr), the "Teachers" area of the main project website will be adapted to represent the Go-Lab Academy and will be linked to the Academy website, so the users can easily find the entrance. Closer integration of the Academy website with the Tutoring Platform and Support page is foreseen. Go-Lab Academy and its services (during and after the project time) will be promoted through all dissemination channels.

3.3.2 Sustainability and funding

In order to assure the sustainability of the project results, Go-Lab seeks funding opportunities and initiatives, which can support the project's exploitation.

In the Year 3, Go-Lab participated in **TELL US Awards** (http://tellusawards.eu), which is a two-year project funded by the Seventh Framework Programme and organizing a two-stage contest targeting start-ups and projects developing innovative learning tools. At the first stage, the participants were asked to provide their organization and product descriptions. At the second stage, 16 selected finalists (including Go-Lab) had to create and present their business plans. At this stage, the finalists received online support from start-up consultants and technology experts and participated in a presence workshop, where they had the possibility to present their (intermediate) results and network with the experts and with each other. Although Go-Lab did not win the final, this activity and valuable feedback from the experts helped us in creating our exploitation and sustainability plan.

As for the funding opportunities, recently UT acquired a new project within the **"NWO Human Capital: 21st century skills"** programme, which is a part of the Top sector Creative Industry & Social Infrastructure Agenda. The project focuses on the acquisition of 21st century skills (like reflection, collaboration, problem-solving) in the context of inquiry learning with virtual labs for students from vocational technical education. In this project, Go-Lab methodology and technology (online labs, inquiry learning scaffolds, etc.) will be used and further developed in order to meet the projects' objectives.

[62] As of 15th September 2015. All users, including consortium members (approximately 100 non-consortium members).
[63] Go-Lab teacher interviews: https://goo.gl/ayL2Ca
[64] Go-Lab tutoring session organized by school teacher: https://goo.gl/a4Z4Xr
[65] As of 27th October 2015.

Another initiative Go-Lab aims to participate in is the **IMAILE project** (http://www.imaile.eu, funded by the European Commission, FP7). This project aims at creating a next generation PLE for students in primary and secondary school, supporting them in acquiring knowledge in STEM subjects and containing various learning tools and content. The projects' approach is based on the Pre-Commercial-Procurement (PCP) method, which means that participating consortia will receive support in the preparation for the public procurement and commercial roll-out. This support includes funding and consultancy during the feasibility study, prototype development and its testing with the pilot organizations. A small consortium will be built to apply for this funding. If the proposal is successful, the new consortium will be able to develop a personal learning environment based on the Go-Lab technology and introduce it to the market.

Moreover, two project proposals (using either Go-Lab technology and/or continuing large-scale pilot activities) will be submitted to the Fast Track to Innovation (FTI) pilot, which is a bottom-up measure in Horizon 2020 to promote close-to-the-market innovation activities, and to the Horizon 2020, working area ICT Research and Innovation.

3.3.3 Collaboration with Ministries of Education

As of October 2014 (end of the Year 2), Go-Lab made progress in collaboration with the Ministries of Education in Greece, Spain (Basque country), Netherlands, Portugal, and Switzerland. These activities are documented in the Deliverable D9.3 "Report on Dissemination and Exploitation activities – Year 2" (M24).

In the Year 3, the following activities took place.

In Portugal, NUCLIO signed an agreement with the Ministry of Education to further collaboration and mutual support for science education projects, including Go-Lab, Inspiring Science, and Space Awareness. This agreement formalized the recognition of the Ministry of Education for the quality of these projects and ensured the endorsement for the certification of teachers, schools and students involved in these projects.

In Spain, DEUSTO continued collaboration with the Basque Government. The Go-Lab course for teachers became a part of the Basque Government programme for teacher training and competence building, so the participating teachers receive not only a certificate from Go-Lab, but also an acknowledgement from this governmental programme. Furthermore, DEUSTO aims at receiving official support from the Ministry of Education of Spain.

In addition, DEUSTO started cooperation with the Gredos San Diego Colegios (Gredos San Diego School Network) that includes around 10 schools around Spain. Establishing cooperation with several more school networks and associations is in progress.

In Estonia, a round table with policy makers was organized by UT in order to introduce them to the possibilities offered by the Go-Lab project to support inquiry learning in schools. Additionally, it was discussed how to sustain the outcomes of Go-Lab in the Estonian context. Among the participants of the round table there were representatives from the Ministry of Education and Research, local city government of Tartu, as well as Estonian Teachers Union and government foundations involved in education. The results of the discussion with the Ministry of Education and Research was that it is important to continue collaboration and they would search for financing options to assure sustainability of Go-Lab in Estonia.

In Austria, CUAS met with the representatives of the Austrian Federal Ministry of Education in order to discuss the dissemination and implementation of Go-Lab activities in Austrian schools. As the result, CUAS was given a possibility to participate in the eLearning conference in October 2015 and give a talk to the participating teachers in order to introduce them to the Go-Lab project and its activities for schools.

In Greece, the Ministry of Education plans to use online labs for the final exams in the first year of the high school, thus, being interested in systems like Go-Lab to proceed with the exam organization. In the Year 3, Go-Lab established cooperation with the Greek aggregator of digital content PHOTODENTRO, whose resources (online labs and virtual experiments) will be included in the Go-Lab Repository. Together Go-Lab and PHOTODENTRO want to address the need of the Ministry of Education for a system suitable for both inquiry-based classroom activities and student assessment.

Finally, in Bulgaria Go-Lab together with OpenDiscoverySpace-project came to an agreement with the Ministry of Education to provide access to ODS and Go-Lab resources for all Bulgarian schools. The translation of selected materials, scenarios and ILSs will be organized. These resources will be used in the training workshops that will take place in 2015-2016.

3.3.4 Standardization

During the Year 3, Go-Lab WP4 and WP9 representatives have been involved in standardization activities at different levels and have contributed to the discussions of IEEE P1876 on Networked Smart Learning Objects for Online Laboratories and ISO/IEC WG10 standard group on Internet of Things.

Regarding the ISO group, a UNED representative was invited to the first face-to-face meeting of this standardization group held in Berlin in January 2015. So far, there have been no normative outcomes.

As for the IEEE P1876 group, a virtual meeting took place in February 2015 with the appointment of Miguel Rodriguez Artacho (UNED) as the editor of the IEEE Standard. An informal meeting of P1876 group took place in March 2015 during the EDUCON conference starting a call for contribution of different use cases by the members of the committee.

After that, a regular IEEE P1876 group meeting took place in the context of exp.at 2015 conference in Ponta Delgada (Azores Islands). In frame of this meeting, the contributed use cases were studied. Three of these use cases were contributed by the Go-Lab partners Deusto, UNED, and EPFL. The committee proposed to take the Go-Lab Smart Device use case and interfaces as a basis for the standard. It was also agreed to split network protocol into network and services layers.

Further work of P1876 is expected to be presented at the IEEE FIE Conference in El Paso (Texas) in October 2015.

4 Summary and Outlook

In the third project year, the work of the WP9 focused on promotion of the Go-Lab Portal (Go-Lab Repository and new online labs and Inquiry Learning Spaces, new features of the authoring platform Graasp, Go-Lab Tutoring Platform) and Go-Lab pilot activities, building Go-Lab online community and creation of supportive materials for teachers, establishing contact to related initiatives and political stakeholders, as well as development of the business model.

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, 101 presentations were given, 54 workshops and hands-on activities were organised, and 21 events in cooperation with other projects were conducted. By means of these activities a total number of about 7,502 stakeholders was reached. In addition, about 13,000 stakeholders were addressed with the project booths. 36 scientific publications were published in conference proceedings, scientific journals and books.

Go-Lab online community significantly increased its number of members counting 1,685 members by the end of Year 3 (including newsletter recipients and social media group members and followers). Furthermore, Go-Lab was promoted in external online portals (like Open Education Europa, Novaator, and derStandard.at) and newsletters of the project partners and other organisations. Dissemination channels of related projects (like Inspiring Science Education, Scientix, eTwinning, etc.) were actively used. The Go-Lab Tutoring Platform was launched and promoted as a central community platform of Go-Lab. Various materials for teachers were published. The development Go-Lab MOOC reached its final phase and the course is being prepared for the official release at the MOOC-platform.

Go-Lab attracted several online lab providers, who contributed their labs to the Go-Lab Portal (e.g., the Concord Consortium, RemLabNet, and others). Further, Go-Lab established cooperation with the FORGE project and founded an EATEL SIG to promote the use of remote labs and online experimentation. Moreover, Go-Lab received support from the Ministries of Education in Basque Country, Austria, Estonia, Bulgaria, and Portugal. Finally, Go-Lab is working on several proposals for the successor projects (IMALE, FTI Pilot, Horizon2020 calls). One proposal ("NWO Human Capital: 21st century skills" programme) has already been accepted.

A business model for the sustainability and exploitation of the project results was developed. This model focuses on two main directions for future commercialization: (1) providing additional tools (e.g. paid online labs) and services (e.g. expert tutoring services) for different target groups at a charge, and (2) providing teacher training in different countries after the project time (teachers' participation sponsored by Erasmus+ and other teacher professional development programmes). In the fourth project year, this model will be verified through the user surveys and finalized after the feedback is collected.

In the Year 4, Go-Lab will concentrate its efforts on the exploitation preparation (e.g. founding an association, transforming project results into sustainable products, promoting Go-Lab Academy brand, etc.), seeking funding for successor-projects, promoting the project among Ministries of Education, building sustainable teacher community and providing implementation recommendations and guidelines for schools. Dissemination work will continue to promote the Go-Lab infrastructure and training and support services for teachers. The project results will be documented and made available through scientific publications. The Go-Lab technology will contribute to the development of new standards produced by IEEE.

Annex: Overview of dissemination activities (Year 3)

Activity	Date(s)	Country	Nr. of participants	Link (if available)
PRESENTATIONS, KEY NOTES, INVITED TALKS				
Presentation of the paper "Helping each other teach: design and realization of a social tutoring platform" at EiED conference 2014	25.11.14	Austria	50	http://immersiveeducation.org/EUROPE
Go-Lab presentation the EPS conference	30.06.15	Austria	45	http://eps-hep2015.eu/
Go-Lab presentation at "Future job campus - Speed Dating"	12.03.15	Austria	40	
Presentation at TELL US Awards Workshop	11.05.15	Belgium	30	http://tellusawards.eu/
Presentation of the paper "An investigation with European science teachers on how to characterize Remote and Virtual Labs" at EDUCON conference 2015	19.03.15	Estonia	30	http://www.educon-conference.org/educon2015
Go-Lab presentation at ISATT 2014 conference	21.11.14	Estonia	25	http://koostoopaevad.archimedes.ee/conference-21-november-2014/program/
Presentation at Estonian biology teachers conference	21.02.15	Estonia	50	
Presentation at Estonian chemistry teachers conference	21.02.15	Estonia	30	http://goo.gl/d7lTJ6
Presentation at University of Tartu Tallinn day	09.04.15	Estonia	30	
Presentation of the paper "Planning and Designing Remote Experiment for School Curriculum" at EDUCON conference 2015	18.03.15	Estonia	30	http://www.educon-conference.org/educon2015
Presentation of the paper "The AppComposer Web Application for School Teachers: A Platform for Translating and Adapting Educational Web Applications" at EDUCON conference 2016	18.03.15	Estonia	30	http://www.educon-conference.org/educon2015
Presentation of the paper "Evaluation of an experiment design tool in a virtual learning environment" at the ESERA conference 2015	04.09.15	Finland	30	http://www.esera2015.org/
Key note on "How to use online labs in science instruction" at Finnish National Educational Researcher conference	21.10.15	Finland	100	http://www.it2015.fi/
Presentation of the paper "Guidance in computer supported inquiry learning environments in science" at the ESERA conference 2015	04.09.15	Finland	30	http://www.esera2015.org/
Go-Lab presentation at IPPOG Spring Meeting 2015	15-17.04.15	France	40	
Go-Lab pitch at TELL US Awards	12.06.15	France	50	http://tellusawards.eu/

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Presentation of the Paper: "Using Differences to Make a Difference: A Study in Heterogeneity of Learning Groups" at CSCL conference 2015	11.06.15	Germany	40	http://www.isls.org/cscl2015/
Go-Lab presentation for project "BiSS - Bildung durch Sprache und Schrift"	02.06.15	Germany	4	http://www.biss-sprachbildung.de
Presentation at LEARNTEC congress 2015	29.01.15	Germany	15	http://www.learntec.de/de/home/homepage.jsp
Go-Lab Portal presentation at a workshop of the Greek Physics Union	30.06.15	Greece	45	
Go-Lab Portal presentation at a workshop of the Greek Physics Union	30.07.15	Greece	30	
Presentation at the 4th ICNF 2015	27.08.15	Greece	80	http://indico.cern.ch/event/344173/
Go-Lab presentation at Science Fair	28.08.15	Greece	80	
Presentation of the paper "Characterizing Virtual and Remote Laboratories with Educational Metadata" at EDEN Open Classroom Conference 2015	21.09.15	Greece	150	http://eden.ea.gr/
Presentation of the paper "Flipped Classroom Teaching Model Templates for STEM Education" at EDEN Open Classroom Conference 2015	21.09.15	Greece	150	http://eden.ea.gr/
Go-Lab Portal presentation at a workshop of the Greek Physics Union	21.12.14	Greece	600	
Go-Lab Portal presentation at a workshop of the Greek Physics Union	06.02.15	Greece	30	
Presentation of the paper "Towards a Metadata Schema for Characterizing Lesson Plans Supported by Remote and Virtual Labs for School Science Education" at CELDA conference 2015	25.10.15	Ireland	120	http://www.celda-conf.org/
Go-Lab pitch at the STEM conference	01.10.15	Netherlands	100	http://www.platformbetatechniek.nl/conferentie/day-2
Go-Lab presentation at ESA Summer School	08-10.07.15	Netherlands	100	http://goo.gl/OAOJpq
Key note on "Highlights in Leren: Technologie en de innovatie van leeromgevingen" at NSCU conference	20.11.14	Netherlands	200	http://www.nscu.nl/
Go-Lab pitch for de Nationale denktank	09.09.15	Netherlands	10	
Go-Lab project Workshop (for lab-owners)	03.06.15	Portugal	15	http://paginas.fe.up.pt/~expat/index.php?/projects/program-overview/
Go-Lab presentation in Colégio Sra Boa Nova	02.10.14	Portugal	421	
Go-Lab presentation in Centro de Interpretação Ambiental da Pedra do Sal	04.10.14	Portugal	21	
Go-Lab presentation in Planetário Calouste Gulbenkian	18.10.14	Portugal	60	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Go-Lab presentation in Escola Secundária José Saramago	22.10.14	Portugal	100	
Go-Lab presentation in Colégio da Imaculada Conceição	28.10.14	Portugal	100	
Go-Lab presentation in Escola Secundária de Fontes Pereira de Melo	07.11.14	Portugal	22	
Go-Lab presentation in Centro de Interpretação Ambiental da Pedra do Sal	09.11.14	Portugal	22	
Go-Lab presentation in Escola Secundária Maria Lamas	11.11.14	Portugal	20	
Go-Lab presentation in St. Julian's School	18.11.14	Portugal	30	
Go-Lab presentation at Astro Hands-On	05.12.14	Portugal	20	
Go-Lab presentation at Astro Hands-On	30.01.15	Portugal	10	
Go-Lab presentation in Centro Escolar Auracária	04.02.15	Portugal	30	
Go-Lab presentation in Escola Básica 2 e 3 Amarante	05.02.15	Portugal	5	
Go-Lab presentation in Escola Secundária de Marco de Canaveses	05.02.15	Portugal	10	
Go-Lab presentation in Escola Secundária Camilo Castelo Branco	07.02.15	Portugal	5	
Go-Lab presentation in Escola Secundária Marques de Castilho	10.02.15	Portugal	5	
Go-Lab presentation in Escola Secundária de Romeu Correia	12.02.15	Portugal	5	
Go-Lab presentation in Agrupamento de Escolas de Seia	13.02.15	Portugal	5	
Go-Lab presentation in Escola Básica Barbosa du Bocage Setúbal	24.02.15	Portugal	23	
Go-Lab presentation in Escola Secundária Adolfo Portela	24.02.15	Portugal	18	
Go-Lab presentation in Colégio Quinta do Lago	25.02.15	Portugal	7	
Go-Lab presentation in Agrupamento de Escolas de Vendas Novas	26.02.15	Portugal	6	
Go-Lab presentation in Solisform Setúbal	03.03.15	Portugal	3	
Go-Lab presentation in Escola Padre Joaquim Maria Fernandes	04.03.15	Portugal	6	
Go-Lab presentation in Escola Secundária do Entroncamento	05.03.15	Portugal	6	
Go-Lab presentation in Agrupamento de Escolas N2 de Abrantes	05.03.15	Portugal	6	
Go-Lab presentation in Escola Secundária Jacome Ratton	06.03.15	Portugal	5	
Go-Lab presentation in Escola Secundária da Amadora	19.03.15	Portugal	7	
Go-Lab presentation in Escola Profissional de Almada	19.03.15	Portugal	3	
Go-Lab presentation in Colégio Liceal de Santa Maria de Lamas	07.04.15	Portugal	12	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Go-Lab presentation in Escola EB 2,3 Sofia de Mello Breyner	08.04.15	Portugal	8	
Go-Lab presentation in Escola Básica Adriano Correia de Oliveira	08.04.15	Portugal	12	
Go-Lab presentation in Escola Básica e Secundária Rodrigues de Freitas	09.04.15	Portugal	6	
Go-Lab presentation in Colégio D. Dinis I	10.04.15	Portugal	5	
Go-Lab presentation in Escola Secundária da Maia	28.04.15	Portugal	7	
Go-Lab presentation in Escola Básica de Miragaia	30.04.15	Portugal	4	
Go-Lab presentation in Escola Básica 2,3 Vallis Longus	30.04.15	Portugal	4	
Presentation of the paper "Enhancing the Usability of the Blackbody Radiation Remote Lab" at Exp.at conference 2015	03.06.15	Portugal	25	http://paginas.fe.up.pt/~expat/index.php?/projects/program-overview/
Presentation of the Go-Lab paper "Archimedes Remote Lab for Secondary Schools" at exp.at conference 2015	03.06.15	Portugal	50	http://paginas.fe.up.pt/~expat/
Go-Lab presentation in EBn.º 3 de Condeixa	04.11.14	Portugal	64	
Go-Lab presentation in Escola Secundária de Gago Coutinho	19.11.14	Portugal	160	
Go-Lab presentation in Escola D. Carlos I	27.01.15	Portugal	29	
Go-Lab presentation in Colégio D. Afonso V	27.01.15	Portugal	3	
Go-Lab presentation in Escola Básica do Catujal	27.02.15	Portugal	14	
Go-Lab presentation in Agrupamento de Escolas de Vilela	09.04.15	Portugal	8	
Go-Lab presentation Escola Básica e Secundária de Coronado e Castro	12.05.15	Portugal	7	
Go-Lab presentation in Agrupamento Escolas Vieira de Araújo	13.05.15	Portugal	2	
Go-Lab presentation in Escola Básica de Lanhas	21.05.15	Portugal	4	
Go-Lab presentation in Externato de Penafirme	21.05.15	Portugal	3	
Go-Lab presentation in Agrupamento de Escolas Garcia de Orta	28.05.15	Portugal	4	
Go-Lab presentation on Principe Island	29.05.15	São Tomé and Prínci	10	
Go-Lab presentation in São Tomé	05.06.15	São Tomé and Prínci	230	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Invited talk at CHANGEE workshop in scope of EC-TEL conference 2015: "Applying Learning Design and Learning Analytics to Support Assessment in Hybrid and Scalable Educational Ecosystems"	18.09.15	Spain	12	http://educate.gast.it.uc3m.es/changee/
Go-Lab presentation at Canary Island	21.07.15	Spain	13	
Presentation of the paper "Go-Lab MOOC – An online course for teacher professional development in the field of Inquiry-Based Science Education" at EDULEARN conference 2015	06.07.15	Spain	60	http://iated.org/edulearn/
Key note on "Online labs in the science classroom; How cognitive scaffolds support students to engage in effective learning experiences." REV2015 conference	25.02.15	Thailand	150	http://www.rev-conference.org/REV2015/key-notes.php
Presentation of the paper "An HTML Client for the Blackbody Radiation Lab" at REV conference 2014	26.02.15	Thailand	50	http://www.rev-conference.org/REV2015/
Key note on "Learning in online science laboratories; how to create well-structured and scaffolded learning experiences" at iSER 2014 conference.	01.11.14	Turkey	150	http://www.i-ser.net/iser_conferences-1.2.18.html
Go-Lab presentation at Scientix conference	23.04.15	UK	50	
Go-Lab presentation at Teacher Training Event, Banbury Space Studio	23.01.15	UK	20	
Twilight Teacher Training Session at Cardiff University	13.02.15	UK	10	
Twilight Teacher Training Session at Cardiff University	11.03.15	UK	10	
Go-Lab presentation at National Astronomy Meeting Outreach Session	05-09.07.15	UK	30	http://nam2015.org/
Go-Lab presentation at National Astronomy Meeting Teachers Session	05-09.07.15	UK	30	http://nam2015.org/
Go-Lab presentation at National Astronomy Meeting Robotic Telescopes Session	05-09.07.15	UK	30	http://nam2015.org/
Go-Lab presentation at Space UK Conference Liverpool	13-15.07.15	UK	500	http://www.ukspace2015.co.uk/
Go-Lab presentation at eSTEeM, Open University, Milton Keynes	16.04.15	UK	50	http://goo.gl/J6cI0d
Go-Lab presentation and distribution of leaflets at the OER event	29.01.15	UK	60	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
WORKSHOPS, DEMONSTRATIONS, TRAININGS				
Workshop "Go-Lab Portal: online laboratories, inquiry learning scaffolds, and inquiry learning spaces for science teaching in schools" at ESERA confernece 2015	02.09.15	Finland	4	http://www.esera2015.org/
Online workshop for teachers	05.03.15	Austria	5	
Online workshop for teachers	05.05.15	Austria	3	
Round table with Austrian Federal Ministry of Education	11.03.15	Austria	30	
MIMI e-tools training	16-17.09.15	Austria	12	
Workshop for teachers	31.08.15	Brasil	6	
Go-Lab online workshop	01.12.14	Brasil (online)	6	
Teacher's workshop at Sofia	27.05.15	Bulgaria	29	
Workshop "Go-Lab: Global Online Science Labs for Inquiry Learning at School" at Universidad Católica de Chile	11.11.14	Chile	6	
Teacher Training	17.01.15	Cyprus	16	
Teacher Training	24.01.15	Cyprus	16	
ICT Demonstration: Designing inquiry learning spaces for online labs in the Go-Lab platform, at the 16th Bennial EARLI conference (2015)	28.08.15	Cyprus	25	http://www.earli2015.org/
Professional development workshop	21.01.15	Cyprus	12	
Professional development seminar	11.02.15	Cyprus	20	
Go-Lab demonstration	20.04.15	Cyprus	8	
Research seminar on "Rich Open Educational Resources for Personal and Inquiry Learning" at Tallinn University	18.03.15	Estonia	28	
Round table with policy-makers	23.01.15	Estonia	20	
Go-Lab workshop at Estonian biology teachers conference	22.02.15	Estonia	25	
Go-Lab workshop for teachers	12.03.15	Estonia	7	
Go-Lab workshop at Estonian physics teachers conference	21.03.15	Estonia	11	http://www.fyysika.ee/?page_id=61740

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Go-Lab workshop for teachers	16.04.15	Estonia	7	
Go-Lab workshop for teachers	13.05.15	Estonia	10	
Go-Lab workshop for teachers at Tartu linna haridusfestival	20.10.15	Estonia	20	
Go-Lab workshop for students at Tartu linna haridusfestival	20.10.15	Estonia	25	
Organization of Go-Lab Special Session at EDUCON conference 2015	14.03.15	Estonia	30	https://www.conftool.com/educon2015/sessions.php
Go-Lab workshop at the EDEN conference, Greece	19.09.15	Greece	14	
Workshop on "Participatory Design Theory and Practice" at JTEL Summer School 2015	08.07.15	Italy	30	http://goo.gl/IoriNZ
Workshop on "User Tracking and Learning Analytics" at JTEL Summer School 2015	09.07.15	Italy	30	http://goo.gl/IoriNZ
Workshop on "Using Method Triangulation in the Analysis of Inquiry- Learning Scenarios" at JTEL Summer School 2015	09.07.15	Italy	30	http://goo.gl/IoriNZ
Workshop at International Conference “New Perspectives in Science Education”	21.03.15	Italy	25	http://conference.pixel-online.net/NPSE/
Twents Meesterschap (Go-Lab workshop)	28.01.15	Netherlands	25	https://www.twenteacademy.nl/nieuws-docenten/2015/
Go-Lab workshop at ORD conference	19.06.15	Netherlands	10	http://www.ord2015.nl/nl/Home
Go-Lab workshop at the conference for Young teachers in physics and chemistry	04.10.14	Netherlands	9	http://www.jongnvon.nl/?page_id=48
Go-Lab workshop in scope of the Universe Awareness International Workshop 2015	06.10.15	Netherlands	8	http://unawe.org/events/workshop2015/
Go-Lab Demo on the exp.at 2015 (best demo award)	04.06.15	Portugal	150	http://goo.gl/UjnLTO
eMadrid workshop on Remote Laboratories	20.02.15	Spain	60	http://goo.gl/BGtltF
Go-Lab presentation at Hands On Astronomy Conference, Cardiff	16.04.15	UK	20	http://goo.gl/fSkznK
Teacher workshop on the Go-Lab Portal with focus on radioactivity and "Bond Lab"	28.01.15	UK	3	
Teacher workshop on the Go-Lab Portal and code compiler app	05.03.15	UK	3	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Teacher workshop on the Go-Lab Portal with focus on radioactivity and "Bond Lab"	15.04.15	UK	21	
Teacher workshop on the Go-Lab Portal, demo of the "pH scale" and "Craters" online labs	27.04.15	UK	4	
Student lesson on Electricity Lab	29.04.15	UK	13	
Teacher workshop on the Go-Lab Portal, "Crater" ILS, and authoring tool	08.05.15	UK	24	
Teacher workshop on the Go-Lab Portal and authoring tool	18.05.15	UK	8	
Teacher workshop on the Go-Lab Portal, "Electricity" and "Splash" labs	03.06.15	UK	14	
Teacher workshop on the Go-Lab Portal with focus on radioactivity and "Bond Lab"	11.06.15	UK	9	
Teacher workshop on "Electricity" ILS	17.06.15	UK	37	
Teacher workshop on the Go-Lab Portal and authoring tool	18.06.15	UK	5	
Student event on "Craters" ILS and a meeting with science teachers	24.06.15	UK	41	
Student lesson on "Guppies" and "Craters" ILS, informal teacher intro to the Go-Lab Portal and authoring tool	25.06.15	UK	16	
Student lesson on "Gear sketch" and "Craters" ILS	26.06.15	UK	22	
Teacher workshop on the Go-Lab Portal and authoring tool	02.07.15	UK	7	
Teacher workshop on the Go-Lab Portal and authoring tool	06.07.15	UK	6	
Student lesson on "Splash: sinking and floating" ILS	15.06.15	UK	27	
EVENTS IN COOPERATION WITH OTHER PROJECTS				
Workshop on Remote Experiments for Higher Education at eSTEeM, Open University, Milton Keynes	17.12.14	UK	40	http://www.open.ac.uk/about/teaching-and-learning/esteem/
Joint workshop with OnlineLabs4All (Genaral Assembly meeting)	28.05.15	Austria	50	
Go-Lab presentation at Scientix Project Networking event #3	20.02.15	Belgium	16	
Go-Lab presentation at the 5th Science Projects Workshop in the Future Classroom Lab (SPW@FCL#5)	21.02.15	Belgium	20	http://www.scientix.eu/web/guest/spw5-at-fcl-after

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Go-Lab presentation at Scientix Project Networking event #6	08.05.15	Belgium	28	
Go-Lab presentation (to Heads of Schools) at the 6th Science Projects Workshop in the Future Classroom Lab (SPW@FCL#6)	09.05.15	Belgium	50	http://www.scientix.eu/web/guest/spw6-at-fcl-after
Go-Lab presentation (general) at the 6th Science Projects Workshop in the Future Classroom Lab (SPW@FCL#6)	10.05.15	Belgium	20	http://www.scientix.eu/web/guest/spw6-at-fcl-after
Joint workshop with the Ark of Inquiry project	31.03.15	Estonia	20	http://www.arkofinquiry.eu/homepage
Go-Lab workshop at Scienetix Confernce: PÜÜK 11 and Scientix present: Science education in Tallinn Secondary Science school	12.09.15	Estonia	50	http://files.eun.org/scientix/NationalConf/Scientix_Conference_Estonia2015.pdf
Presentation at Inspiring Science Education, CEYS, Open Discovery Space and Quantum Spinoff summer schools	12-17.07.15	Greece	110	http://www.inspiringscience.eu/event/ise-summer-academy-2015
Go-Lab presentation at Scientix National Conference in Israel "Participation of Israeli teachers in STEM European projects"	18.03.15	Israel	300	http://goo.gl/hyGvcN
Workshop on "Inquiry-Based Learning with Online Labs and Mobile Apps" at JTEL Summer School 2015	08.07.15	Italy	30	http://www.prolearn-academy.org/Events/summer-school-2015
WEEF-ICL Go-Lab - FORGE Workshop	20.09.15	Italy	12	http://www.weef2015.eu
Go-Lab presentation at ESA/GTTP Teacher Training Workshop	08-12.12.14	Netherlands	50	http://goo.gl/V0iA2O
IEEE Standardization committee P1876	03.06.15	Portugal	15	http://paginas.fe.up.pt/~expat/index.php?/projects/program-overview/
Go-Lab presentation at the Scientix conference in Spain	24.06.15	Spain	200	
Teacher workshop on the Go-Lab Portal, demo of the "pH scale" and "Craters" labs	18.04.15	UK	41	
IEEE Standardization committee P1876	21-23.10.15	USA	12	https://goo.gl/VHM1Ef
Workshop on "Internet Accessible Remote Experimentation Laboratories of Next Generation"	14.06.15	USA	30	http://goo.gl/QB126e
Go-Lab presentation during Global Hands-On Universe 2015	05.08.15	USA	50	http://handsonuniverse.org/ghou2015/
Go-Lab presentation during GTTP International 2015	09.08.15	USA	20	http://handsonuniverse.org/ghou2015/

Activity	Date(s)	Country	Nr. of participants	Link (if available)
PROJECT BOOTH AND DISCTRIBUTION OF LEAFLETS				
Distributing leaflets during in-service course for teachers	07.11.14	Estonia	25	
Distributing leaflets at Robotex 2014	29-30.11.14	Estonia	5.000	http://www.robotex.ee/eng/history/2014
Distributing leaflets during in-service course for teachers	12.12.14	Estonia	25	
Distributing leaflets during in-service course for teachers	09.01.15	Estonia	25	
Distributing leaflets during in-service course for teachers	06.02.15	Estonia	25	
Distributing leaflets during in-service course for teachers	13.03.15	Estonia	25	
Distributing leaflets during in-service course for teachers	15.05.15	Estonia	25	
Distributing leaflets during in-service course for teachers	16.09.15	Estonia	23	
Distributing leaflets during in-service course for teachers	14.10.15	Estonia	25	
Go-Lab Poster at ESERA conference 2015	31.08-04.09.15	Finland	1.300	http://www.esera2015.org/
Go-Lab leaflet distribution at IPPOG Spring Meeting 2015	15-17.04.15	France	40	
TELL US Awards Exhibition at Future en Seine, Paris	11.06.15	France	50	http://tellusawards.eu/
Distributing leaflets at international conference "Innovative science teaching. The way forward?", organised by the EU Comenius project INSTEM	17-18.06.15	Germany	100	http://instem.tibs.at/content/3rd-instem-conference
Distribution of leaflets at the EDEN conference, Greece	18.09.15	Greece	160	
Distributing leaflets at international conference "New Perspectives in Science Education" 2015	20-21.03.15	Italy	50	http://conference.pixel-online.net/NPSE/
Go-Lab booth at Astrofest, London	06-07.02.15	UK	2.000	http://europeanastrofest.com/
Twilight Teacher Training Session at St Teilos School Cardiff	09.02.15	UK	20	http://goo.gl/rB4MU2
Go-Lab booth at Association of Science Educators Scotland, Aberdeen	06-07.03.15	UK	150	http://www.asescotland.org.uk/
Go-Lab booth at Science and the Assembly, Welsh Assembly	19.05.15	UK	100	http://goo.gl/FKzYbV
Go-Lab booth at The Incredible Power of Light, Welsh Assembly	03.06.15	UK	100	http://goo.gl/VEPTGN
Go-Lab booth at Cheltenham Science Festival	07-12.06.15	UK	2.000	http://www.cheltenhamfestivals.com/science
Go-Lab booth at National Astronomy Meeting	05-09.07.15	UK	600	http://nam2015.org/
Go-Lab booth at Solarsphere, Builth Wells	14-16.07.15	UK	1.000	http://www.solarsphere.events/index.html
Go-Lab materials distributed at Scientix Conference	17-18.04.15	UK	120	