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 D9.5

Report of Dissemination and Exploitation Activities (Year 4)

Editor	Diana Dikke (IMC)
Date	26 October 2016
Dissemination Level	Public
Status	Final

The Go-Lab Consortium

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Executive Summary

In the Go-Lab project, WP9 "Dissemination and Exploitation" aims at promoting the project and its results among different groups of stakeholders (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 4, the project website was visited by 27,468 users[1]. The online community increased the number of its members by 831 users, now counting a total of 2,516 members and followers. In particular, 171 users joined our Facebook group, 444 followed the Twitter channel, 64 and 69 users joined LinkedIn and Google+ groups respectively, and 24 user followed the YouTube channel. 53 stakeholder subscribed to the Go-Lab newsletter. Go-Lab Facebook page could record 427 "likes" [2]. As for the offline dissemination, 94 presentations of the project reaching 5,957 participants were given, 39 workshops and hands-on sessions involving 605 participants were organized by the project, plus 25 joint events reaching 947 participants were organized in cooperation with other communities and consortia, e.g., Scientix, Future Classroom Lab, AMGEN Teach, STEM Alliance, and others. Also, the online channels of the cooperation partners were actively used to promote Go-Lab.

The Go-Lab MOOC "Using online labs in the classroom: an introductory course for teachers" was launched in March 2016 and had three successful runs, which counted a total of 563 participants, from which 62 received a certificate of completion (slightly more than 10%, whereas the average completion rate for MOOCs is less than 7%[3]). Most of the participants[4] were new to Go-Lab and found the course via Go-Lab social media, social media of cooperation partners, or Go-Lab website. Based on participants' feedback, the MOOC was improved preparing for the launch of its final version, which will be available also after the project time.

Regarding the exploitation activities, in the Year 4, Go-Lab collaborated with the Ministries of Education in Austria, Belgium, Estonia, France, Germany, Lithuania, Malta, the Netherlands, Portugal, Slovakia, Spain, Sweden, Switzerland, and Turkey. Furthermore, the Ministries of Education – STEM representatives working group has been launched by EUN in January 2016 and had several meetings during the year. A Sustainability Workshop was conducted with experienced Go-Lab teachers, in order to discuss and validate Go-Lab business model.

1 As of 30th September 2016.
2 As of 30th September 2016. All numbers excluding project members
3 Source: https://www.insidehighered.com/news/2013/05/10/new-study-low-mooc-completion-rates
4 About 70% of those who filled in the questionnaire

Go-Lab consortium will continue its work on the development of the system and its implementation in European schools in scope of the Next-Lab project, funded by Horizon2020 programme. Moreover, in scope of the SiWay project, the key team is developing a commercial product based on the Go-Lab Portal and Learning Management System of IMC, which will be offered to the Ministries of Education in Germany, Spain, Sweden, and Finland. Finally, Go-Lab Academy established a model of financing teacher training through the Erasmus+ programme. All this gives a solid basis for the continuation of work done in Go-Lab and its mid- and long-term sustainability.

Table of Contents

1. Introduction

WP9 concentrates on dissemination of the project among identified groups of individual and organizational stakeholders and on the 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). This Deliverable addresses tasks T9.1 – T9.4, whereas Deliverable D9.6 "Recommendations for the introduction of online labs in schools" addresses tasks T9.5 and T9.6.

Go-Lab dissemination and exploitation activities in the fourth project year included the following initiatives:

- Promotion of the project and its results through online and offline dissemination channels
- Preparation of sustainable offer of products and services for teachers (Go-Lab Portal, but also training and support offer)
- Preparation of the final, sustainable teacher support and training materials (e.g., Go-Lab MOOC, as well as demo-videos and text guidelines created in cooperation with WP6)
- Reflection on and validation of the business model
- Promotion to the main customer and end-users groups, such as Ministries of Education, headmasters, and experienced Go-Lab teachers
- Concept and application for a follow-up project, aiming to further develop Go-Lab technology and continue its implementation with an extended group of stakeholders
- Development of a commercial product based on Go-Lab in scope of a commercial project

This Deliverable is divided into three main parts:

1. 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 assesses Key Performance Indicators and defines directions for future actions.
2. The evaluation of the Go-Lab MOOC launched in the project Year 4, as well as the role of the MOOC in Go-Lab dissemination activities, are presented in Section 3.
3. Finally, the last part of the Deliverable (Section 4) provides a report on Go-Lab exploitation activities in the Year 4 and explains how the project results will be exploited after the project end.

In addition, Annex A provides a list of presence dissemination activities conducted by the Go-Lab consortium in different countries.

2. Dissemination Activities Report

This section is devoted to dissemination activities that were planned for and conducted in the fourth project year. These include online dissemination activities (update of the project website, publishing announcements in the project blog and social media, publishing project newsletter, creation of a Go-Lab Portal demo, as well as launch and update of 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.

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 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	Dissemination of the project results via online channels; support of the workshops and implementation activities (e.g., dissemination materials,	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

Project activities and Results	Dissemination activities	Realization status
Go-Lab inventories (scientific organizations and universities) are available; Go-Lab Portal (pilot and initial versions) is released; evaluation and validation "dashboard" tool is available. Implementation Phase A is running; Practice Reflection Workshops in 10 countries are conducted.	announcements); press release; creation of an official project video or a smart show; creation of workshop videos to be made available online; active use of the project blog and social media (e.g., publishing of short scientific notes, initiating discussions, etc.); contributions to external websites and blogs, publishing of scientific papers, participation in conferences and exhibitions.	blog posts); dissemination materials were printed and shipped to the partners; Go-Lab Smart Show, two demo-videos (Go-Lab Portal and an online lab), and one implementation video (Go-Lab at school) were created; more than 100 dissemination events reaching 5,731 participants; 10 press releases in external portals and newsletters; 16 publications.
Dissemination Phase 3 (M25 – M40)		
Go-Lab classroom scenarios handbook is available; inquiry learning apps, Go-Lab services, and final version of the Go-Lab Portal are released; Go-Lab inventory (external and partner organizations) is available; evaluation of the Go-Lab Portal initial version is done. Implementation Phases B and C are running; Practice Reflection and Summative Workshops are conducted.	Dissemination of the project results via online channels; conducting webinars; support of the workshops and implementation activities; publishing of scientific papers and participation in conferences and exhibitions; dissemination of the implementation and evaluation results, experience reports, and best practices (contributed also by external stakeholders, e.g., most active teachers and the so-called "power-users"); promoting the Go-Lab 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)[5]; 33 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, 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 Tutoring Platform).	Increase of online community by 831 members; 730 own posts and 1,137 actions by users in social media; 158 offline dissemination activities targeting 7,509 participants; 31 scientific publications; 563 MOOC participants (62 certified). Sustainable version of the MOOC, recommendations for teachers, scenarios, and guidelines available on the Support Page, promoted through all channels. Collaboration with Ministries of Education; financing of teacher training through Erasmus+; follow-up project Next-Lab; commercial project SiWay.

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

As one can see from the table, dissemination activities of the fourth project year correspond to the defined plan.

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 proactive position by providing information on the website and in the project's social media channels, and by addressing its target groups via websites and in communities used by the stakeholders. Further, Go-Lab establishes cooperation with related projects and initiatives to address common target groups via online communication channels. This section describes updates in the projects' dissemination channels (compared to M36 documented in D9.4) and provides an overview of online activities taken in the Year 4 as well as statistics.

2.2.1 Project website and blog

The project website (www.go-lab-project.eu) is the main dissemination channel used by the project, as it reaches all identified target groups. It provides general information about the project, the Go-Lab Portal, Go-Lab pilot activities, available results and teacher support, and serves as a connecting point for the social media channels. Furthermore, the project blog integrated in the website informs stakeholders about the latest news, for example, new developments, teacher contests and events, impressions from past events, and so on.

The Go-Lab project website was nominated as one of the finalists of the "2016 .eu Web Awards" (http://webawards.eurid.eu), which is an online competition launched in 2014, in which websites with domains .eu and .ею can participate. The Go-Lab website was nominated in the category Laurels, devoted to the websites of institutions such as schools, training programs, and charitable organizations, promoting ongoing education and/or pan European projects. The nominees will be evaluated by a jury of distinguished representatives from various European stakeholders. They will select one winner in each category on the basis of a number of evaluation criteria, such as website content, structure, navigation, and functionality, as well as visual design and accessibility. The winners will be announced at the ".eu Web Awards" Gala on 16 November 2016 in Brussels, Belgium.

Figure 1. Go-Lab nominated to the "2016 .eu Web Awards" (Laurels category).

In the Year 4, the following updates to the website have been implemented[6]:

- The text on the "Teachers" main page was replaced, now informing teachers and other interested stakeholders about products and services that will be available after the project end. Figure 2 presents the new "Go-Lab continuation" page.
- Under the "Teachers" main menu, a new tab "Teacher Support" (http://www.go-lab-project.eu/instructions-and-support) was created providing information about the Support Page (www.golabz.eu/support) and its materials and services available for teachers.
- Under the "Research" main menu, a new tab "Pedagogic Scenarios" (http://www.go-lab-project.eu/pedagogic-scenarios) was added, representing the six Go-Lab scenarios, which can be used to structure an ILS, and linking to a more detailed page in Golabz Repository (http://www.golabz.eu/scenarios).
- In the project blog, 20 articles were published (thus, the blog currently contains 90 articles in total)[7].
- All texts represented on the website were revised and updated, if it was needed. The list of external partners (http://www.go-lab-project.eu/external-partner) was extended.

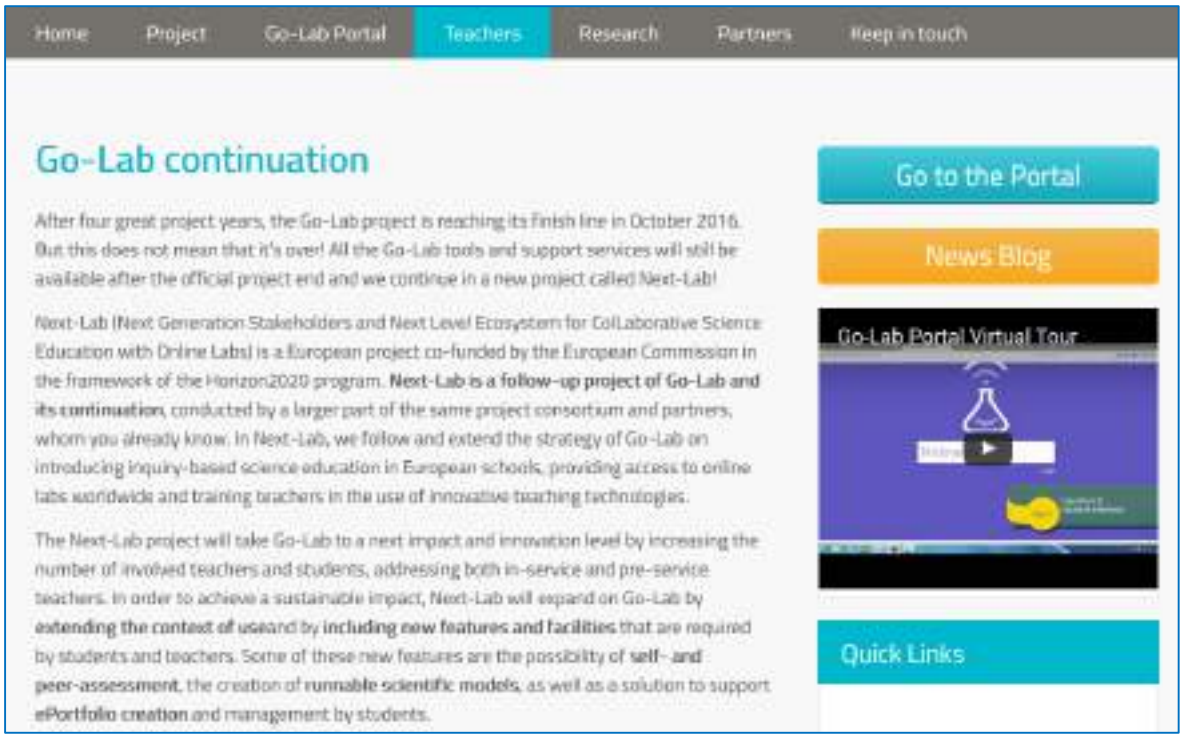

Figure 2. "Go-Lab continuation" page (Go-Lab website).

In the period from the 1st November 2015 to the 30th September 2016, the project website was visited by 27,468 unique visitors[8] (according to the DoW, at least 7,500 unique visitors in the fourth project year were planned). Compared to the previous year, the number of unique

[6] A detailed description of the Go-Lab website including the description of the website structure and navigation, main content types, as well as Content Management System is provided in the deliverable "D9.1 - Project Website and Dissemination Materials" (M6).
[7] As of 30th September 2016.
[8] Website developers from IMC are excluded from the statistics.

visitors has slightly grown (compare to 26,722 unique visitors in the Year 3). Figure 3 provides an overview of the unique visitor numbers over the project time.

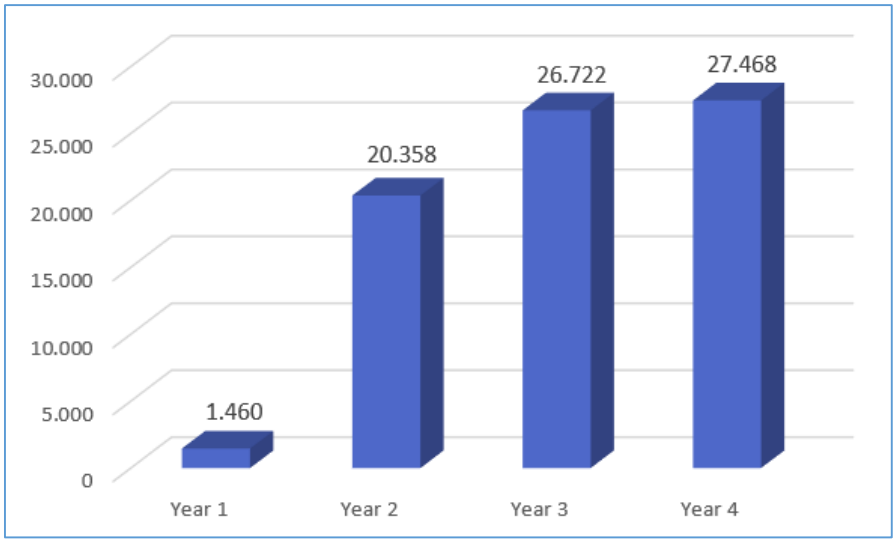

Figure 3. Unique visitors of the Go-Lab website.

Figure 4 represents the number of unique visitors who accessed the website in the fourth project year (01.11.2015-30.09.2016) as well as the average duration of the sessions. The website visits are uniformly distributed over the time period with about 600-800 visits a week (the lowest points of the curve correspond to the times of Christmas and Eastern holidays in most of European countries with an average of 380-580 users a week, as well as summer time with about 400-500 users a week). The visit durations are distributed uniformly as well, with the average visit duration of about 2-3 minutes per visit[9].

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

The curve reaches its highest peaks in the first week of December 2015 (833 users, which is related to dissemination and implementation events conducted in that time period), in the second week of January (791 users, which is related to the start of the school time and Go-Lab activities after the Christmas break, as well as announcement of the Go-Lab MOOC), in the second week of June (774 users, which is related to several dissemination events conducted in cooperation with Future Classroom Lab project), and in the first weeks of

[9] As it was mentioned in the previous deliverables, Go-Lab project website is used as a starting platform to give the first impression about the project, from which the users proceed to the Go-Lab Portal. Also, a big number of robots checking the website decreases the average visit duration.

September (with about 724 – 824 visitors a week, which is related to the beginning of the school year).

Figure 5 represents the users flow on the Go-Lab website providing an overview of traffic sources, landing pages, as well as first and second interaction pages. Approximately 47% of the users[10] land at the homepage, further 25% land at the "Online Labs" page and about 2% each at the "Partner", "Go-Lab Portal", and "Project" pages. About 52% of the users (18,700 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)[11]. Most of these users proceed to the Go-Lab Repository, which received 14,045 users forwarded from the Go-Lab website[12]. In general, the structure of the users flow is similar to the ones from previous years.

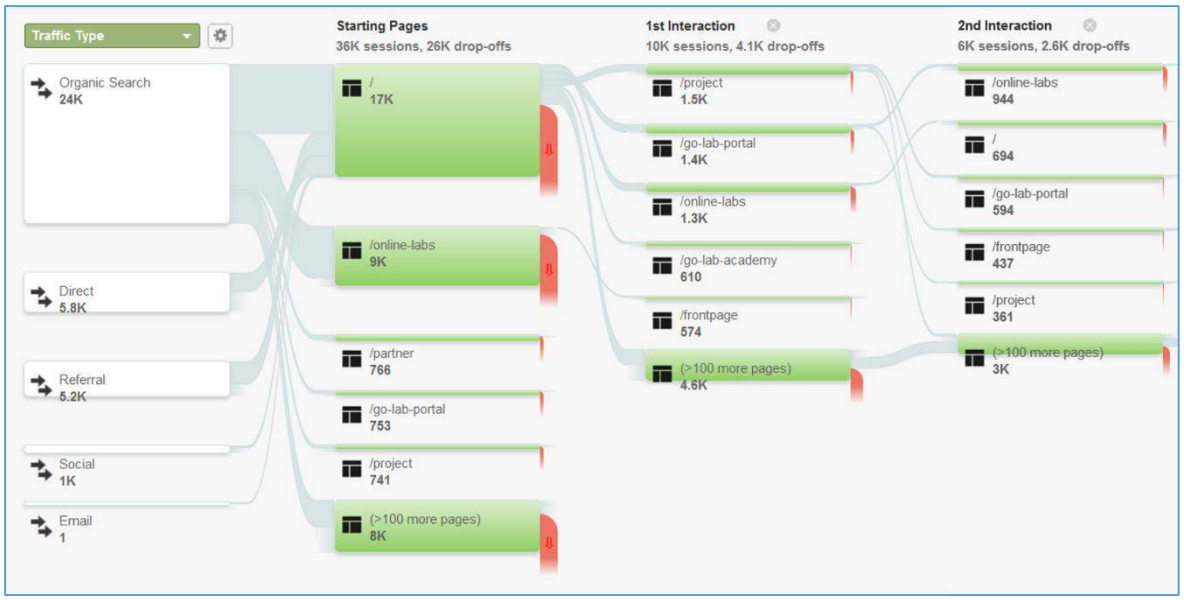

Figure 5. Users flow on the project website (Year 4).

The traffic sources of the Go-Lab website are represented as follows:

- 67% organic search (compare to 54% in the Year 3; users searching for "go lab", "golab", "go-lab portal", and so on),
- 16% direct traffic (users clicking direct links to sub-pages, e.g., provided in dissemination materials or online channels),
- 14% referral traffic (users are redirected from other websites, e.g., www.golabz.eu, https://esa.int, https://eun.org, http://www.scientix.eu, https://golab.ea.gr, graasp.eu), and
- 3% social media traffic (most of the users come from Facebook and Twitter).

[10] 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.

[11] Here, sessions are counted by Google Analytics. The overall bounce rate for the website is 47% of the unique visitors.

[12] In this Deliverable, we do not provide section on Go-Lab Repository statistics anymore, as these are analyzed in detail in the Deliverable D6.5.

As for the user distribution around the world, the website visitors come from the United States (22%)[13], Spain (8%), Portugal (5%), United Kingdom (5%), India (5%), the Netherlands (4%), Greece (4%), Italy (4%), Germany (3%), Romania (2%), Belgium (2%), Estonia (2%), and other countries. 74% of visitors are new, and 26% are returning visitors[14].

In general, the distribution of the visitors around the world in the Year 4 follows the tendencies of the previous project years (see Figure 6). The percentage of unique visitors from "other countries" (contributing less than 1.5% to the overall distribution and not presented in the figure below) is 27% (Year 4), which shows that Go-Lab is wide spread among countries in the "long tail". In order to keep the diagram below readable, we display the data labeling only for the Year 4.

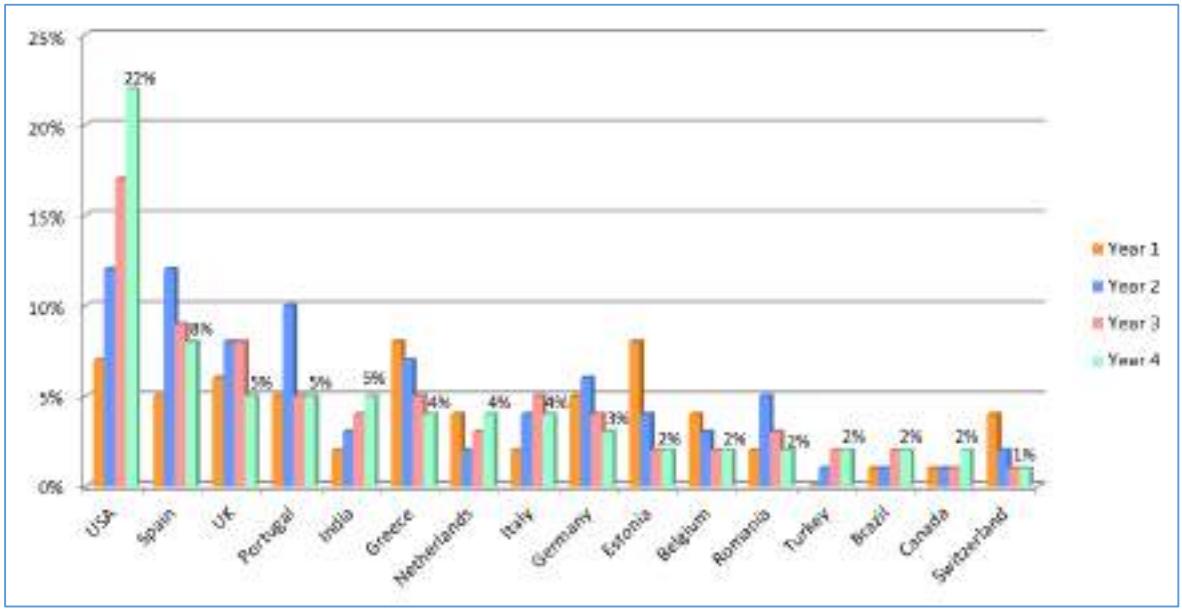

Figure 6. Website session distribution by country in Year 1 – Year 4.

2.2.2 Social media channels

In order to support communication between the project and the users and to support community building activities, Go-Lab is presented in several social media communities and content sharing channels. Facebook[15], Google+[16], and LinkedIn[17] 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.

[13] This can be explained by the fact that we provide access to online labs of the US providers (for example, PhET Interactive Simulations, Concord Consortium, East Tennessee State University, etc.). However, it has to be considered that multiple visits could be caused by web robots (short visit duration). An exact number of such visits is unknown.

[14] Visitors coming to the Go-Lab website proceed to the Go-Lab Portal (see explanation to the Figure 5, on the pages 12-13), so there is no need for them to come back to the main website again, if they already know about the project.

[15] Facebook Group: www.facebook.com/groups/golab.project, Facebook Page: www.facebook.com/GoLabProject. The Facebook page is a kind of „landing" page providing information about the project. This page can be "liked" and "shared", whereas the group can be "joined".

[16] Google+ Group: plus.google.com/u/0/communities/103544792011493828793

[17] LinkedIn Group: www.linkedin.com/groups?gid=4946895&trk=myg_ugrp_ovr

Facebook is mostly used by teachers and people working with teachers, whereas LinkedIn provides an opportunity to find technology and dissemination partners. Google+ has quite mixed auditory. Additionally to the main project groups, an Estonian Facebook group[18] and two Facebook groups for Go-Lab Summer School participants[19] (in Volos, 2013 and Marathon, 2014-2016) are available. Social sharing platforms (YouTube[20], SlideShare[21], and Flickr[22]) are used to provide videos, presentations, and photos in the web, sharing, commenting, and discussing them. Twitter[23] distributes project messages in the form of micro content containing mostly the main topic and a link.

As of 10th October 2016, the project Facebook page counts 1,088 "likes" (427 of them are from the Year 4). The main Facebook group has 868 members (839 of them are project external; 171 members joined in the Year 4). The Google+ and LinkedIn groups currently have 144 (129 external; 69 joined in the Year 4) and 140 (123 external; 64 joined in the Year 3) members accordingly. The Go-Lab Twitter channel counts 1,037 followers (most of them project extern, no exact information; 444 joined in the Year 4) and follows 149 members.

SlideShare (22 followers, 19 of them project extern; 6 joined in the Year 4) and Flickr (8 followers; not known if project extern; no progress in the Year 4) 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 24 users and currently counts 94 followers (not known if project extern).

Figure 7 (on the next page) represents the number of users joining Go-Lab project communities and following the project in the social sharing channels[24]. As one can see from the figure[25], the number of Go-Lab followers has increased in the fourth project year in a slightly better rate than in the year before: in the Year 4, 1,205 members joined Go-Lab communities (compare to 1,035 in Year 3). In total, 35% of the community members and followers joined Go-Lab in the Year 4.

[18] Estonian Facebook group: https://www.facebook.com/groups/golabe
[19] Facebook groups for Summer School participants: https://www.facebook.com/groups/615756051790568 and https://www.facebook.com/groups/1449374291994271
[20] YouTube Channel: www.youtube.com/user/GoLabProject
[21] SlideShare Channel: www.slideshare.net/GoLabProject
[22] Flickr Channel: www.flickr.com/photos/go-lab-project
[23] Twitter Channel: twitter.com/GoLabProject
[24] The total numbers are represented; no differentiation between project external and internal users.
[25] To keep the figure readable, we don't display the data labels for the previous years, where the numbers are small.

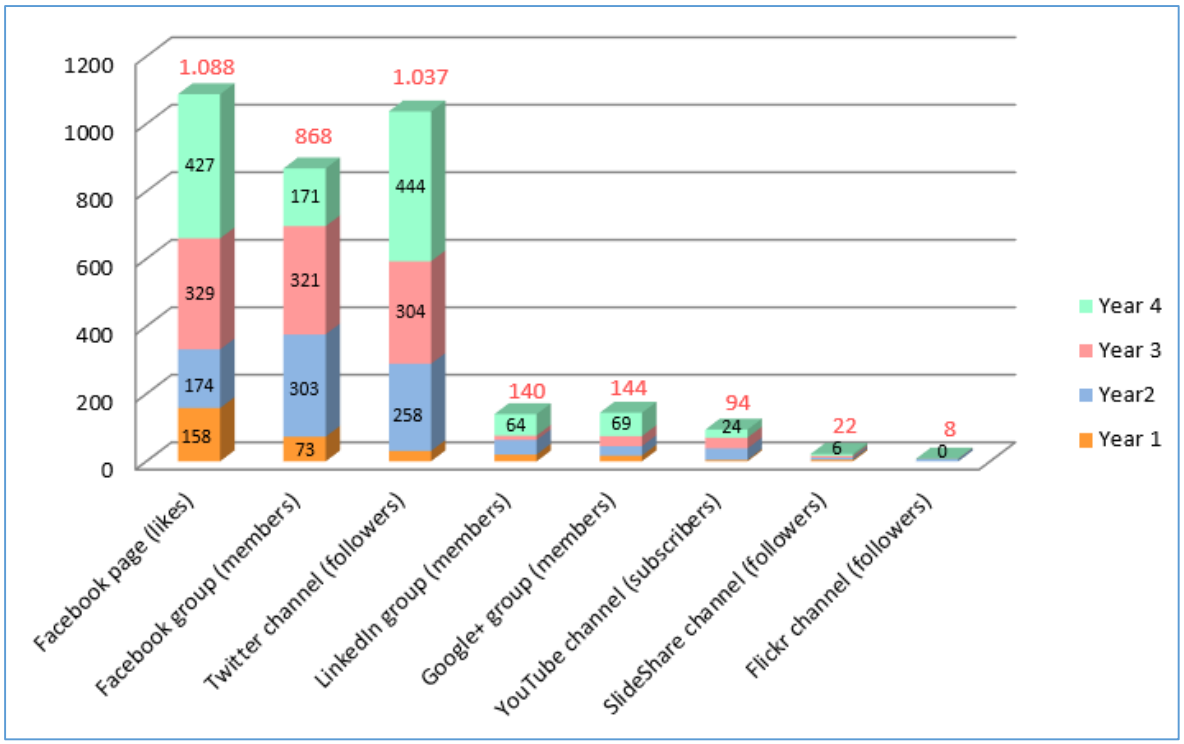

Figure 7. Go-Lab Social Media Audience (Year 1 – Year 4).

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 30th September 2016, project Facebook page counts 265 posts (131 from the Year 4), Facebook group – 745 posts (182 from the Year 4), Google+ group – 382 posts (147 from the Year 4), LinkedIn group – 53 posts (10 from the Year 4), YouTube channel – 50 own uploads (15 from the Year 4), SlideShare channel – 26 presentations (16 from the Year 4), Flickr channel – 25 albums (3 from the Year 4) representing 392 pictures (154 from the Year 4). Go-Lab Twitter channel currently counts 1,603 tweets and retweets (226 from the Year 4).

Figure 8 (on the next page) represents social media content statistics, including the number of posts in the Year 1, Year 2, Year 3, Year 4, as well as cumulative numbers[26].

[26] To keep the figure readable, we don't display the data labels for the previous years, where the numbers are small.

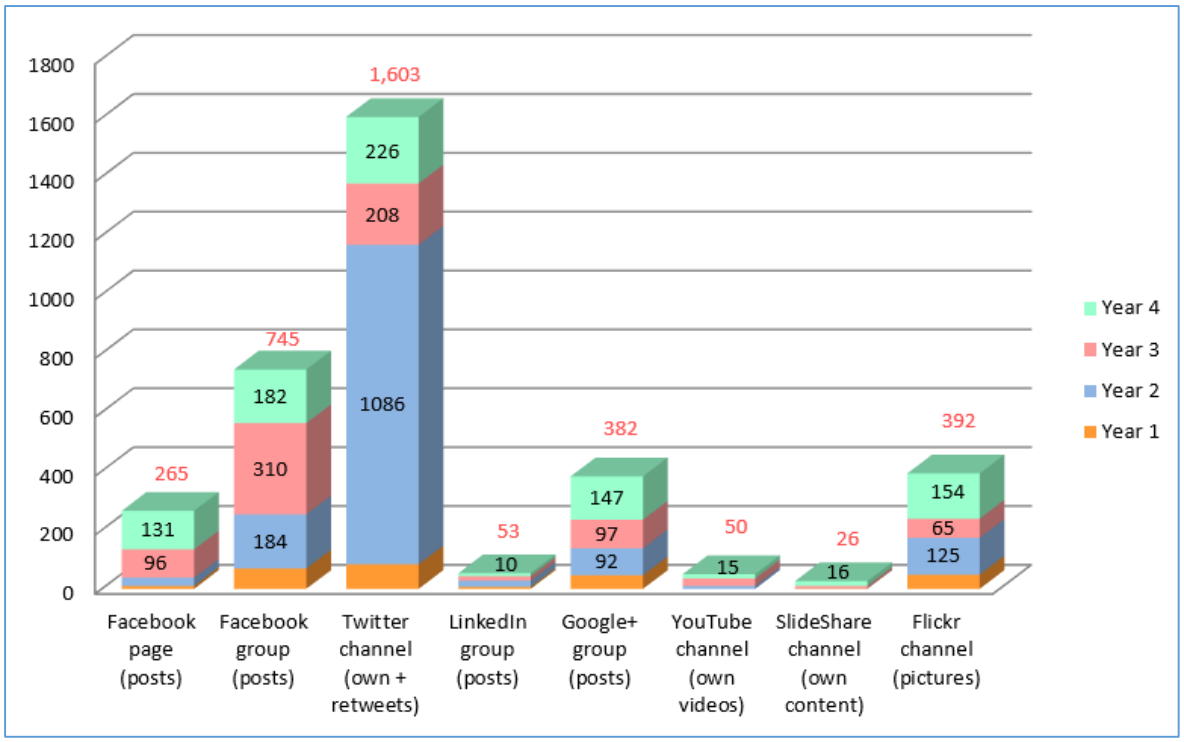

Figure 8. Social Media Content Statistics (Year 1 – Year 4).

As one can see from the 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, 67 posts were published in the Facebook group and on the Facebook page. Also, the project's posts on Twitter were retweeted or the project was mentioned in the posts of other users 470 times. The new Go-Lab Portal Virtual Tour[27] was viewed more than 1,956 times.

Figures 9 and 10 (on the next page) present several examples of user posts about Go-Lab on Facebook and Twitter.

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 (5,437 members)[28], Teaching Online – Facilitating Online Learning (7,672 members)[29], Future Classroom Scenarios (1,900 members)[30], STEM Educators (18,638 members)[31], Teachers helping Teachers (22,358 members)[32], Creative Classroom Lab (3,609 members)[33], Galileo Teachers Groups (1,034 members)[34], Technology Enhanced Learning (976 members)[35], and others.

[27] Go-Lab Portal Virtual Tour: https://www.youtube.com/watch?v=ctlq-HPaNKw
[28] Science Teachers in Europe: https://www.facebook.com/groups/ScienceTeachersEurope
[29] Teaching Online: https://www.facebook.com/groups/372438642805998/
[30] Future Classroom Scenarios: https://www.facebook.com/groups/futureclassroomscenarios
[31] STEM Educators: https://plus.google.com/u/0/communities/112904336188381403474
[32] Teachers helping teachers: https://plus.google.com/u/0/communities/113166595976911311283
[33] Creative Classroom Lab: https://www.facebook.com/groups/1411752155722721/
[34] Galileo Teachers Group: https://www.facebook.com/groups/galileoteachers/
[35] Technology enhanced learning: https://www.facebook.com/groups/100995759984129/

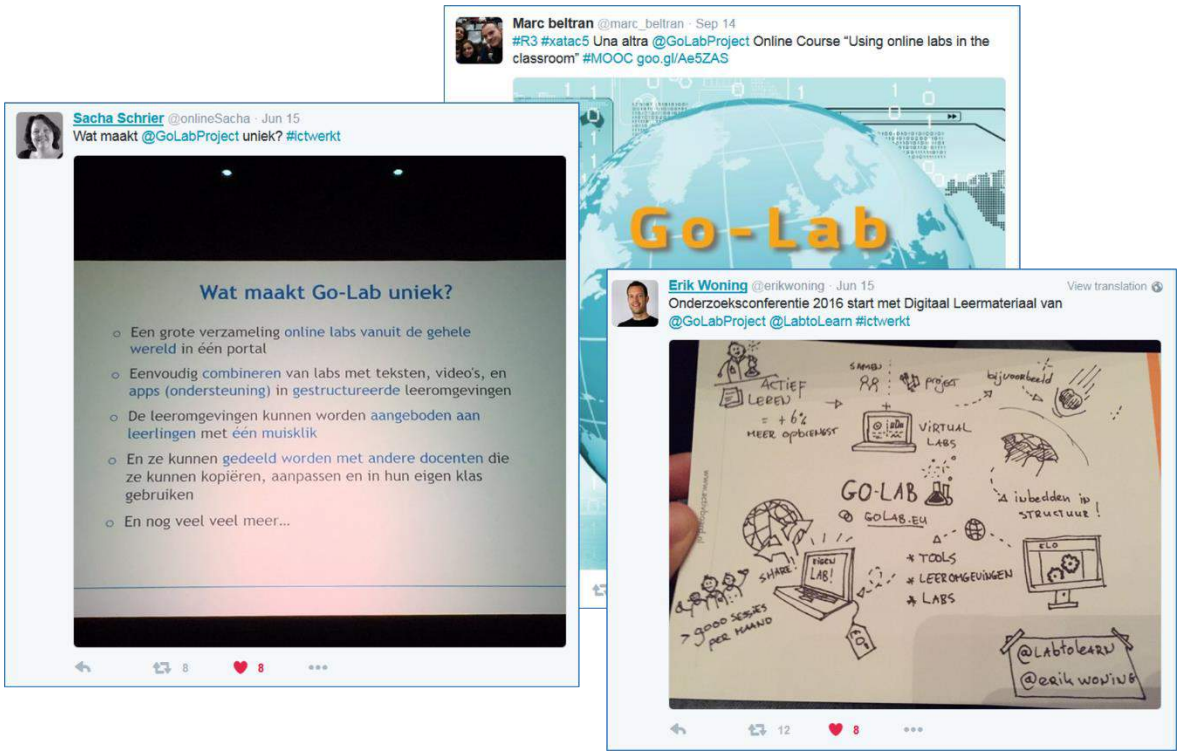

Figure 9. Examples of user posts about Go-Lab in Twitter.

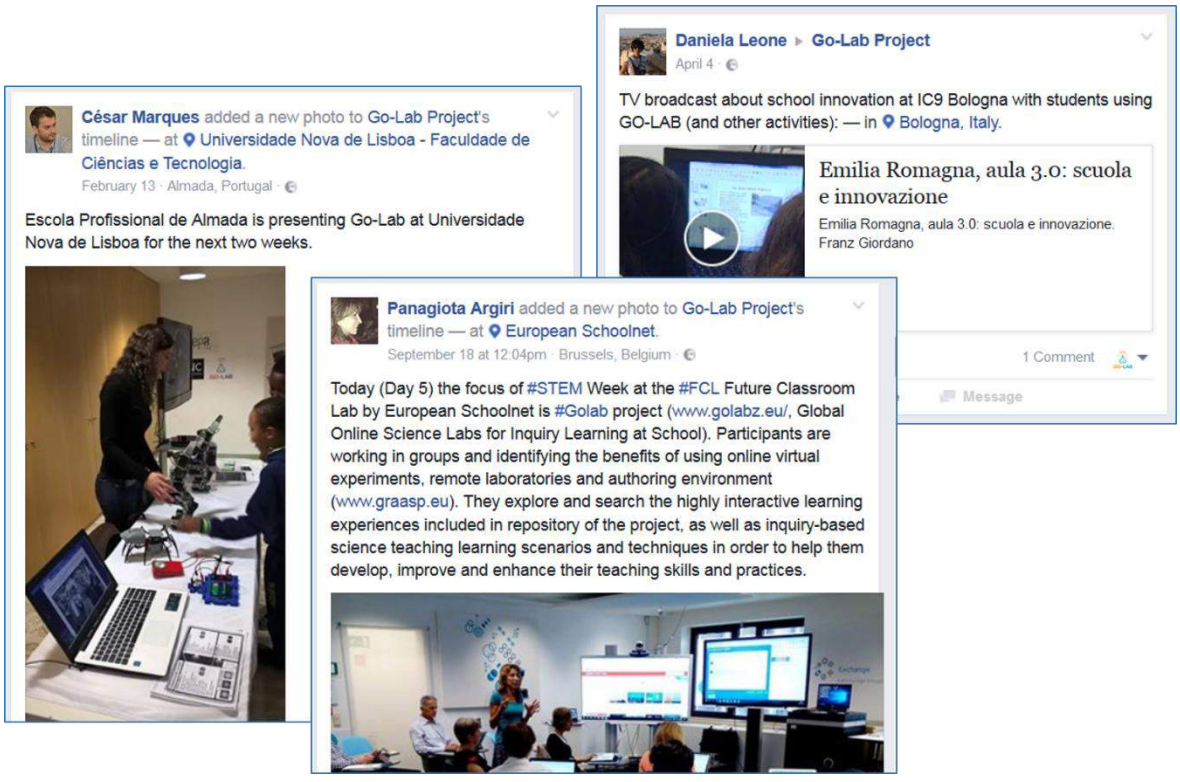

Figure 10. Examples of user posts about Go-Lab on Facebook.

Furthermore, Go-Lab was actively promoted through Facebook[36] and Twitter[37] channels of European Schoolnet (12,761 and 13,300 members/followers accordingly), Twitter channel of Scientix[38] (5,214 followers), and other channels of cooperation projects. A new cooperation project TEMI[39] joined the network promoting Go-Lab and its resources.

Finally, in order to find out who our target group is and how they got known about Go-Lab online community and joined it, we posted a small question in our Facebook group and kept it online for approximately three months. 34 group members responded to it and we got the following results:

- "I'm Go-Lab pilot teacher (I implement Go-Lab in my school)": 13 (38%)
- "I was informed about Go-Lab through another project (Scientix, ODS, Amgen Teach, STEM Alliance, etc.)": 14 (41%)
- "I participated in a Go-Lab workshop/presentation": 2 (6%)
- "My colleague told me about Go-Lab and invited me to join": 3 (9%)
- "I found Go-Lab through the internet/social media": 2 (6%)

Figure 11 presents the Facebook question and the answers of the group members.

Figure 11. How did the participants join Go-Lab Facebook group?

2.2.3 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 events, as well as cooperation and

[36] Facebook channel of EUN: https://www.facebook.com/european.schoolnet
[37] Twitter channel of EUN: https://twitter.com/eu_schoolnet
[38] Twitter channel of Scientix: https://twitter.com/scientix
[39] TEMI project: http://www.teachingmysteries.eu

participation possibilities[40]. The newsletter 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 10th October 2016, there are 330 project external recipients of this newsletter (53 joined in the Year 4). The distribution of the recipients by countries (in the Year 4) is led by Portugal (20%), the Netherlands (13%), Italy (9%), Spain and India (each 7%), as well as United States (6%). Other countries are represented with 2%-4% of the recipients each. As in the previous years, many subscribers come from non-pilot countries, such as Albania, Croatia, Latvia, Nigeria, Turkey, and others. (See Figure 12 representing the newsletter recipients by country in the Year 4).

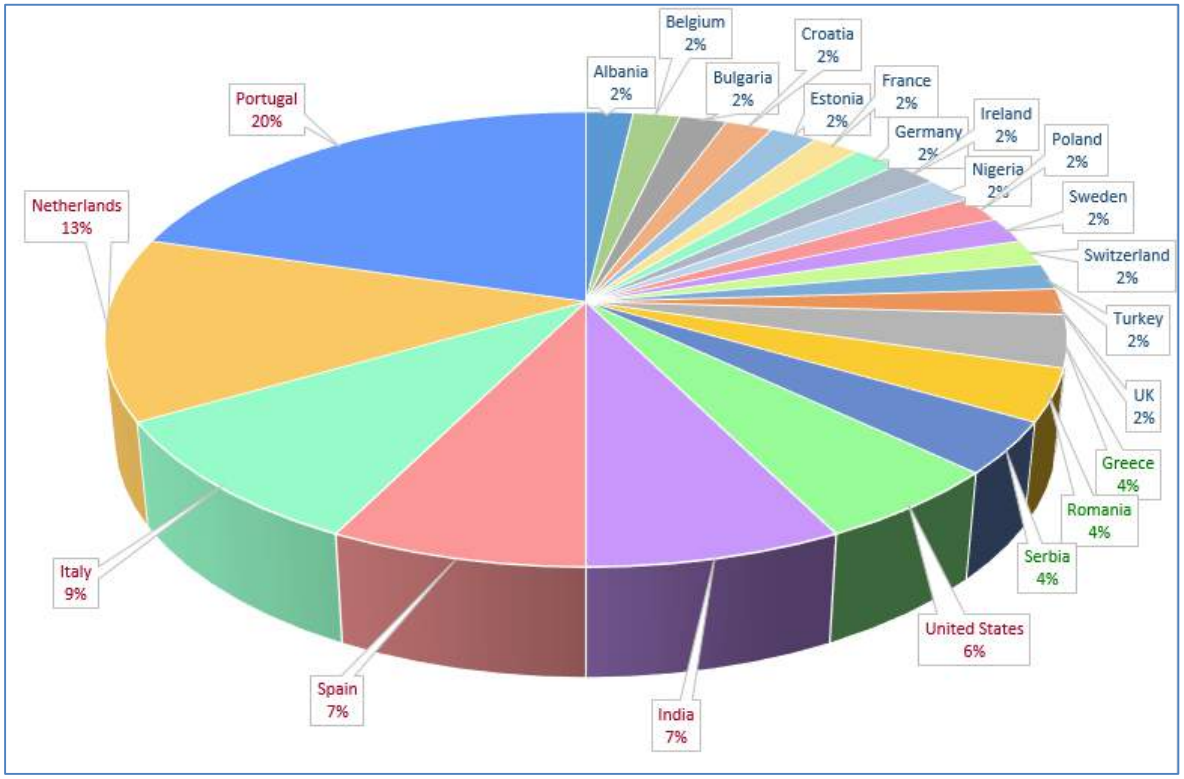

Figure 12. Newsletter recipients by country (Year 4).

[40] Past newsletters are available for download on the website: www.go-lab-project.eu/download-material

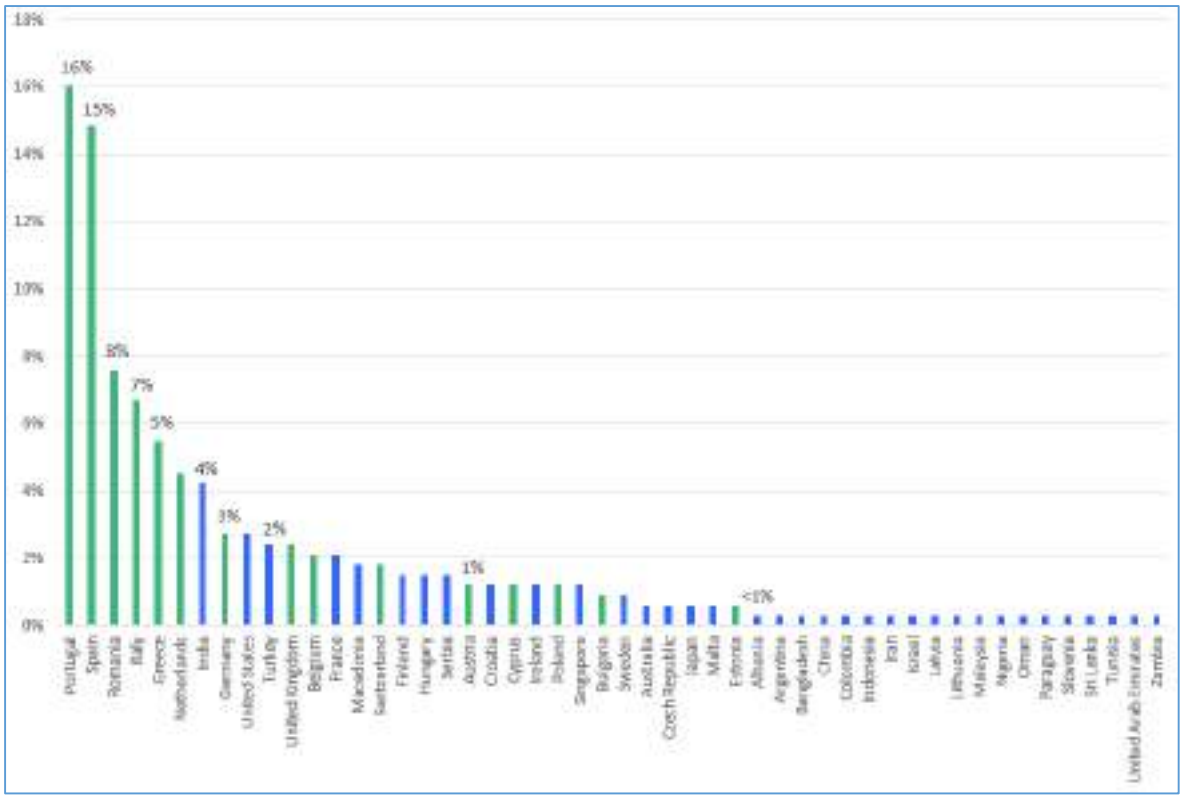

Figure 13. Newsletter recipients by country (Year 1 – Year 4).

If looking on the countries of origin of all 330 recipients (see Figure 13), we can see that the distribution is led by Portugal (16%), Spain (15%), Romania (8%), Italy (7%), Greece and the Netherlands (each 5%), India (4%), as well as Germany and United States (each 3%). Thus, seven of the fifteen pilot countries are represented in the left part of the diagram. The other eight pilot countries are represented each with less than 3% of the newsletter recipients. In total, 69% of the newsletter recipients come from the Go-Lab pilot countries (marked green, Figure 13 on the previous page).

In the distribution presented in the Figure 13, we can see the "long tail" again (compare to the website statistics, Section 2.2.1) showing that Go-Lab reached audiences around the world. In total, the newsletter recipients come from 50 countries[41] (whereas the website was visited by users from almost every country in the world).

87% of the recipients (registered in the Year 4) work in Education, Training and Library sector, 6% in Engineering, 4% in Science and Research, and 2% each in Information Technology and Other sectors. The distribution among all 330 newsletter recipients shows similar trend with the majority of recipients working in educational sector (84%), science and research sector (8%), engineering (3%), information technology (3%), and others (see Figure 14 on the next page).

[41] Here, we rely on the data provided by the recipients in the newsletter registration form. It might be that some data is incorrect.

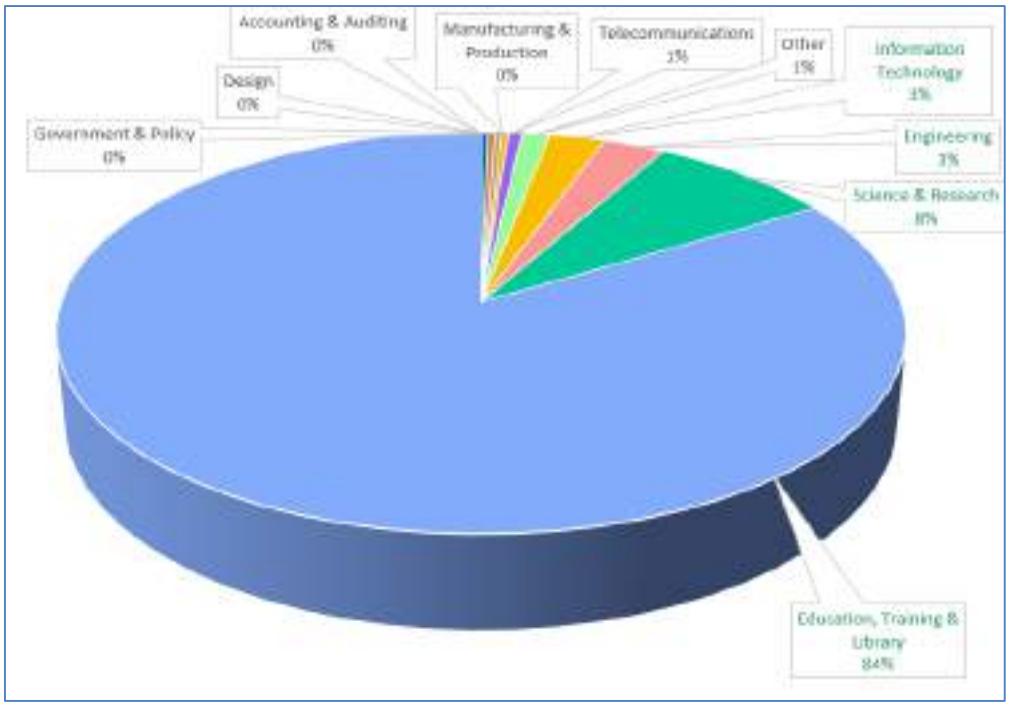

Figure 14. Newsletter recipients by business sector (Year 1 – Year 4).

In the project years 1 to 4, from those newsletter recipients who filled in the field "Your organisation" and/or "Your position" of the newsletter registration form (269 recipients filled in these fields, 82% of all recipients), 53% work in schools as teachers, heads of school or department (8%), and other school personnel (2%). Furthermore, 23% of the recipients work in universities or other research institutions, 9% work in business sector and 4% in public sector. Several recipients (1%) work as teacher trainers and some recipients (1%) are university students. Figure 15 represents the fields of occupation of the newsletter recipients.

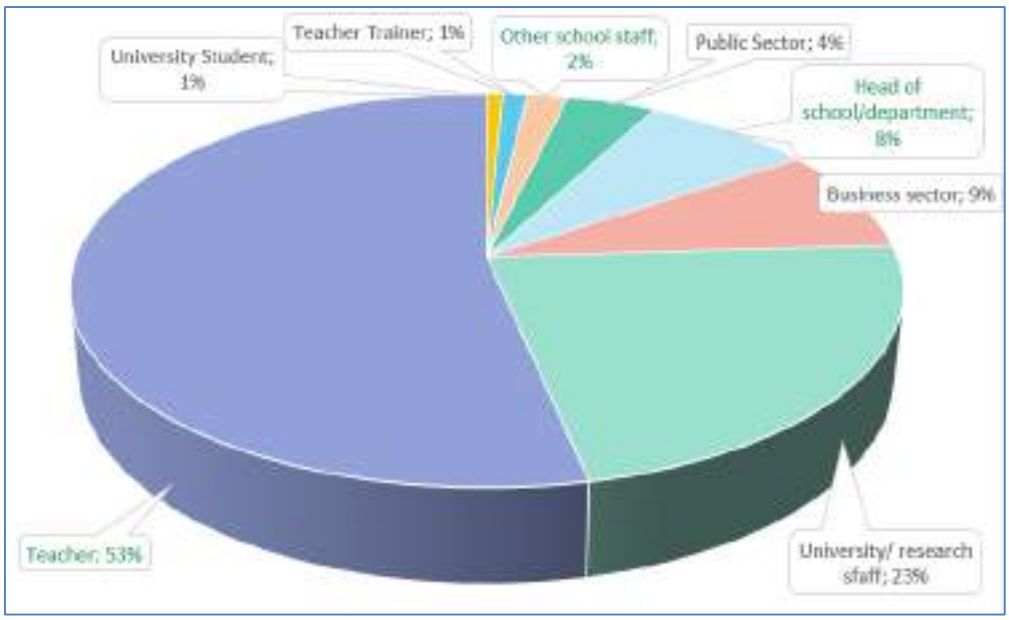

Figure 15. Fields of occupation of the newsletter recipients.

As presented in the Figure 16, most of the teachers and other school representatives come from European countries, led by Portugal (22%), Spain (13%), Romania (11%), Greece (8%), and Italy (8%). Twelve pilot countries are represented making up 74% of the newsletter recipients working in schools.

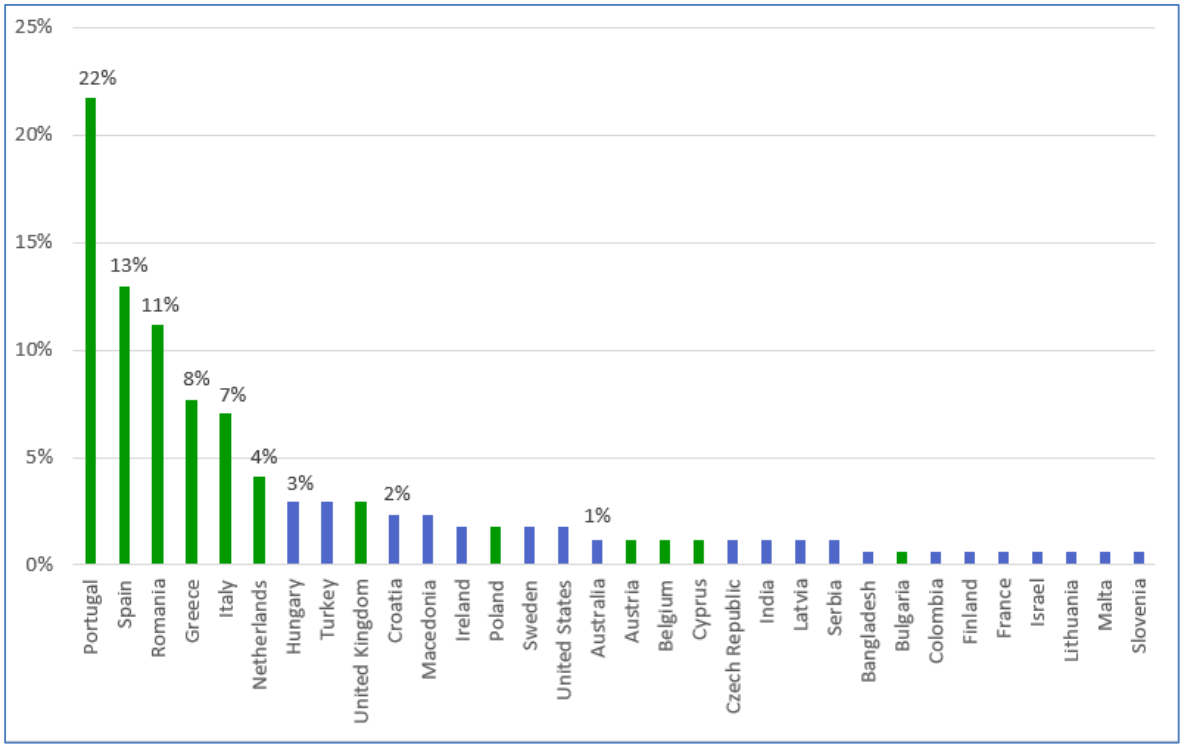

Figure 16. Newsletter recipients from schools by country.

If analyzing the reach of the Go-Lab newsletter, in 52% of the cases the recipients open the newsletter and in 12% of cases they click the links provided in the newsletters. The least reach is registered in December as well as in summer months (July and August).

Besides WP9 general newsletter, there is a WP6 newsletter for teachers providing information on the latest updates in the Go-Lab Portal, new teacher support materials, and upcoming events for teachers. This newsletter is sent to pilot teachers and Go-Lab MOOC participants, participants of the Go-Lab MOOC, and other members of the Go-Lab community. The statistics of the WP6 mailing list are presented in the Deliverable D6.5.

2.3 Offline Dissemination Activities

This section presents an overview of conducted offline dissemination activities and corresponding statistics, provides information on cooperation with related projects and associations, as well as a list of publications of the fourth project year.

The dissemination activities of Go-Lab include the organization of small scale focused activities like local workshops and presentations for teachers, large scale dissemination events (e.g., summer schools, workshops organised together with related projects, and project presence at international conferences), publishing papers in conference

proceedings and international journals, as well as international promotion of the project and its results (e.g., in countries outside the EU).

Activities reported in this Deliverable include only dissemination activities; no implementation activities are counted. If a dissemination activity with one target group (new coming teachers) and an implementation activity with another target group (Go-Lab teachers) took place at the same school in one day, these are reported separately in different deliverables. The list of all dissemination activities (including event name, country, number of participants, and a link, if available) is provided in the Annex A.

2.3.1 Dissemination activities by countries

In the fourth project year, Go-Lab was presented at multiple conferences and scientific events, as well as in scope of large-scale teacher events and small workshops. A total amount of 7,509 stakeholders[42] (mostly teachers, but also scientists, online lab providers, and representatives of associations and projects) was reached. Moreover, about 12,600 stakeholders were addressed with 16 project booths at conferences and exhibitions.

The dissemination events were conducted in 27 countries, mostly in Europe, but also in Brazil, Canada, Columbia, Costa Rica, India, Japan, Mexico, São Tomé and Prínci, and USA. Several international online events took place. 82% of events (129 events) were conducted in pilot countries (Austria, Belgium, Bulgaria, Cyprus, Estonia, Germany, Greece, Netherland, Poland, Portugal, Spain, Switzerland, and UK) covering 81% of all dissemination activity participants.

There were no large-scale dissemination activities in Italy and Romania (however, teachers from these countries were addressed by the project contest: four winners of the contest "Teaching Through Inquiry" come from Italy 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, Global Hands-On Universe, and others) which took place mainly in Belgium on EUN premises.

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 158 events, number of participants in the country and their percentage of a total of 7,509 participants, as well as an average number of participants per event per country[43]. (Pilot countries are marked green).

[42] An approximate number based on partners' estimations, as of 30th September 2016

[43] 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 Poland there was one event for 100 participants; the average number of participants is 100. In Belgium there were 18 events, in which a total number of 419 participants took part; the average number of participants per event is, thus, 419/18 = 23 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
Portugal	28	1313	47	18%	17%
United Kingdom	21	328	16	13%	4%
Belgium	18	419	23	11%	6%
Spain	14	843	60	9%	11%
Netherlands	12	1894	158	8%	25%
Germany	9	230	26	6%	3%
Greece	9	324	36	6%	4%
Estonia	6	160	27	4%	2%
Austria	5	255	51	3%	3%
Serbia	4	86	22	3%	1%
Norway	4	350	88	3%	5%
USA	4	340	85	3%	4%
Online	3	28	9	2%	0%
Switzerland	3	95	32	2%	1%
China	2	70	35	1%	1%
Brazil	2	50	25	1%	1%
Cyprus	2	120	60	1%	2%
France	2	22	11	1%	0%
Bulgaria	1	32	32	1%	0%
Canada	1	150	150	1%	2%
Columbia	1	20	20	1%	0%
Costa Rica	1	20	20	1%	0%
India	1	50	50	1%	1%
Ireland	1	15	15	1%	0%
Japan	1	30	30	1%	0%
Mexico	1	75	75	1%	1%
Poland	1	100	100	1%	1%
São Tomé and Prínci	1	90	90	1%	1%
TOTAL	**158**	**7,509**	**48**		

Figure 17 (on the next page) visualizes information presented above. Blue bulks stand for percentage of events conducted in particular country (of a total number of 158 events) and red bulks – for percentage of participants in the country (of a total of 7,509 participants).

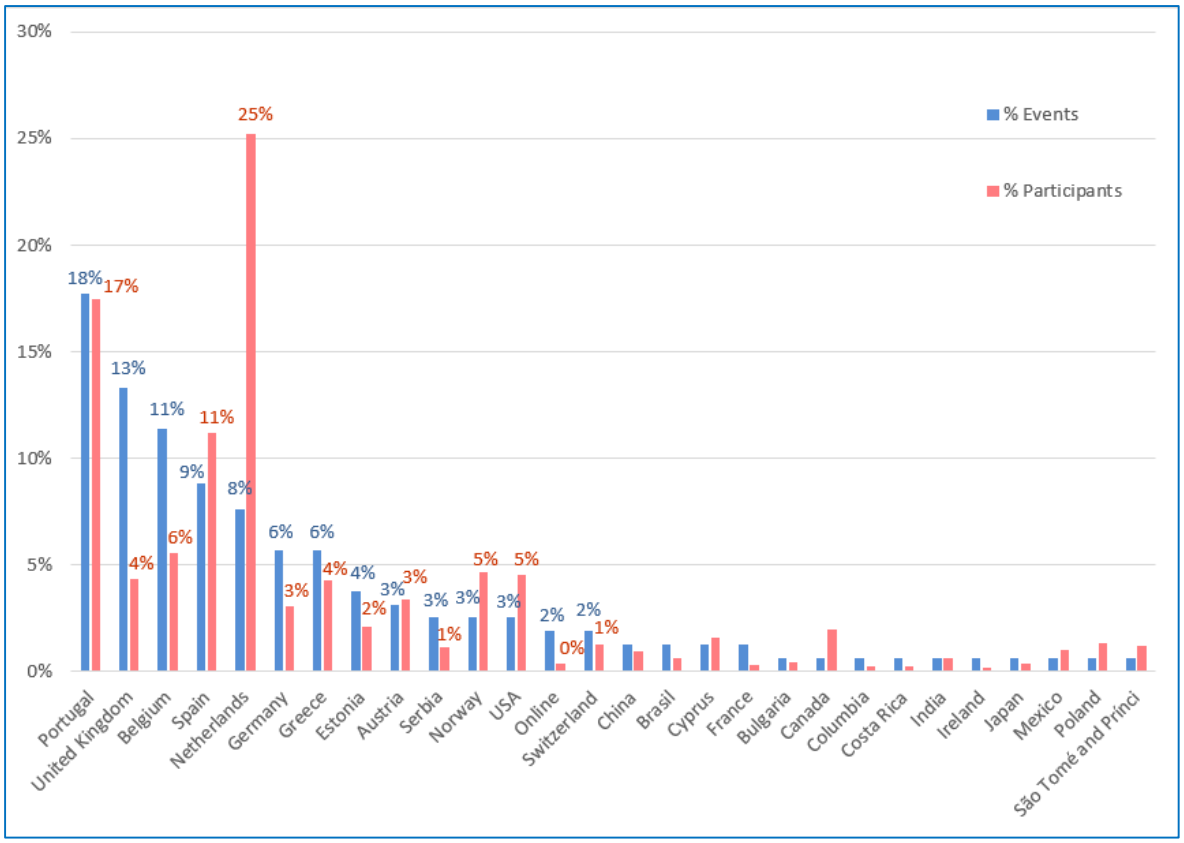

Figure 17. Percentage of dissemination events and participants per country.

Figure 18 (on the next page) represents the number of dissemination activities per country in the last three years[44]. As one can see from this figure, most of dissemination events were conducted in Portugal, UK, Greece, Netherlands, Estonia, Belgium, Spain, Germany, and Austria. 93% of events were conducted in pilot countries. A total of 40 countries[45] (plus online events) is represented on the chart. The number of events per country varied across different years, mostly depending on cooperation possibilities with other projects and availability of international conferences in a country in particular year. The events organized in the countries in the "long tail" were mostly presentations, workshops, and round tables conducted in scope of international conferences.

[44] Here, we do not include Year 1 numbers, as most of dissemination events in Year 1 took place in Portugal (organized in cooperation with Discover the Cosmos project). This huge difference between the number of events in Portugal and other countries in the Year 1 makes the Figure almost not readable, if including this data into it.

[45] Plus Australia and Taiwan in the Year 1

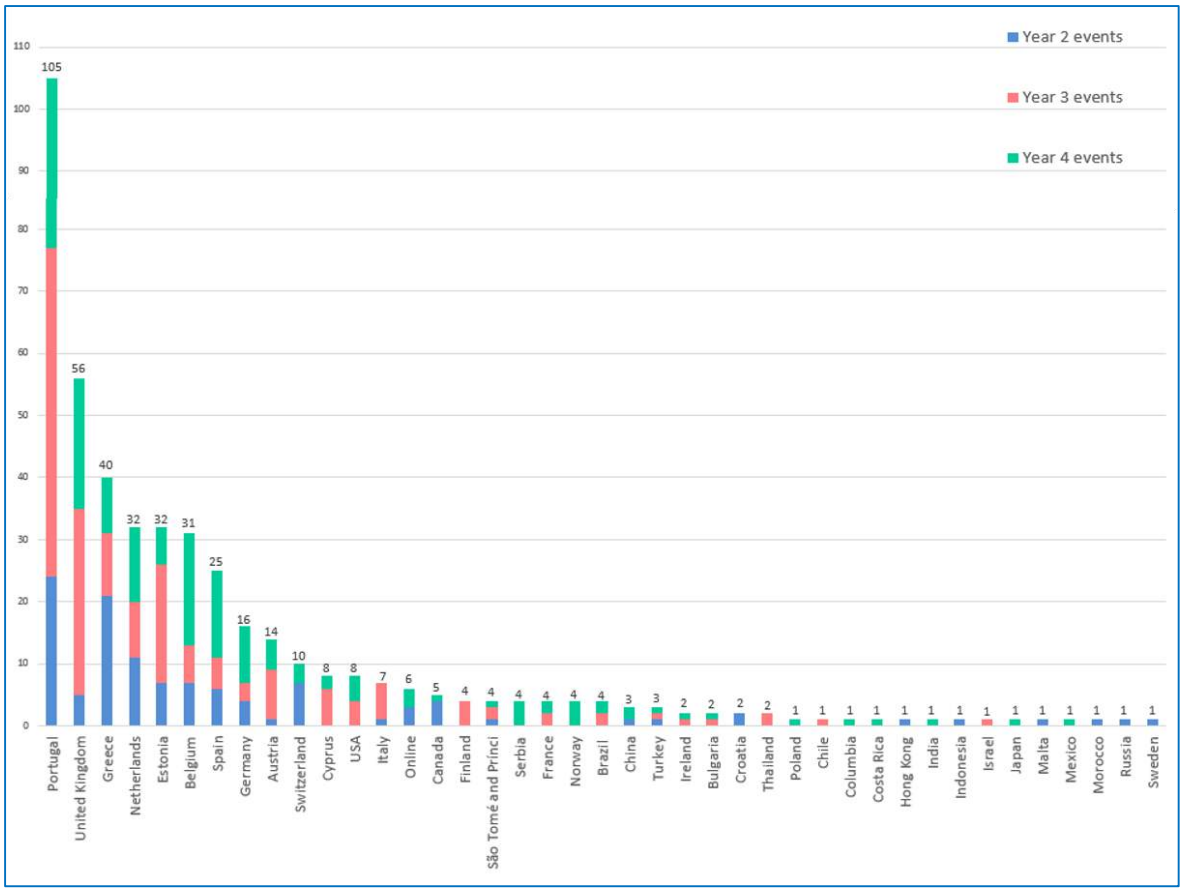

Figure 18. Number of dissemination events per country (Year 2 - Year 4).

2.3.2 Presentations, workshops, synergy actions

In the Year 4, the Go-Lab partners gave 94 presentations (including key note speeches mentioning Go-Lab, invited talks, paper presentations, etc.) for 5,957 participants, conducted 39 workshops and hands-on sessions with 605 participants, and organized 25 joint events together with other projects and organizations for 947 participants. In addition, Go-Lab was represented with a booth or distributed project leaflets at 16 events targeting around 12,600 participants. An average number of participants per presentation was 63 persons, 16 persons per workshop, and 38 persons per joint event. Figure 19 (on the next page) represents the number of dissemination events and participants (in brackets) in the four years of the project.

The number of workshops and demo-sessions reported to the WP9 in the Year 4 is lower than in the previous year. This year, most of the workshops and hands-on sessions took place in scope of implementation activities, targeting experienced Go-Lab teachers (pilot teachers) and not newcomers (who were mainly addressed by project presentations and demonstrations, as well as synergy actions organized together with related projects).

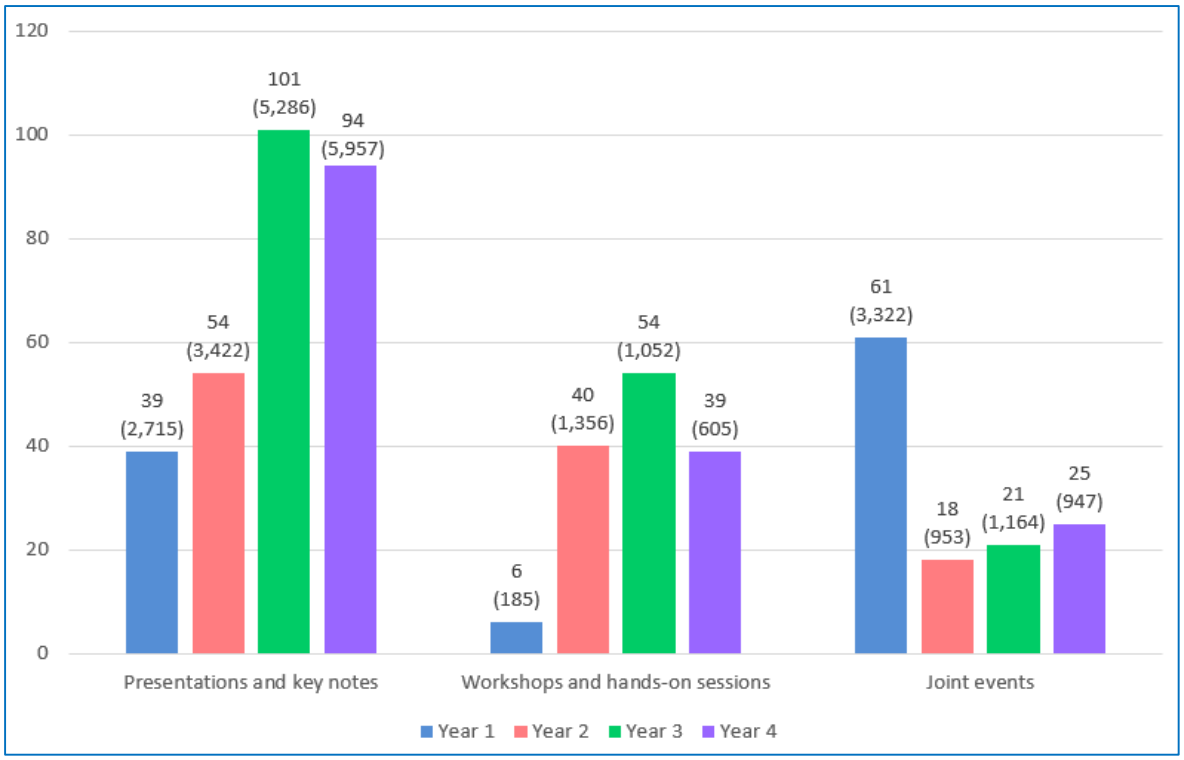

Figure 19. Dissemination events by type (Year 1 – Year 4)[46].

Presentations (94 events/ 5,957 participants):
In the Year 4, the project was presented at multiple international conferences, such as IMCL in Greece, ICTIEE in India, REV, INTED, and EDULEARN in Spain, AERA in the US, QED in Bulgaria, and EARLI in Belgium. Moreover, Go-Lab partners gave presentations at large scientific and teacher events like National Conference for Science Education in Portugal, National Astronomy Meeting and Bridgend Astronomical Society Meeting, UK, meeting of the Swiss Physics Teacher Society, Switzerland, and other events. In addition, multiple introductory presentations were given in scope of national teacher events, like teacher conferences and school visits.

Workshops (39 events/ 605 participants):
Go-Lab organized workshops in scope of multiple conferences and fairs in different countries, such as at ICWL conference in China, at STEM-Day 2015 in Germany, Frist Mediterranean Science Festival on Cyprus, JTEL Summer School in Estonia, and others. National workshops and events were organized in the Netherlands in scope of national conferences, in Portugal in scope of school visits, as well as in Estonia, UK, Germany, and Spain. Several online workshops took place. Finally, Go-Lab was presented to the representatives of Ministries of Education from multiple European countries, as well as in scope of the "STEM representatives working group" meeting (see Section 4.1.3 for more details).

[46] The high number of joint events in Year 1 is explained by the events organized in cooperation with Discover the Cosmos project (which ended in 2013, so in the following Go-Lab project years no events could be organized together with them). The low number of workshops and hands-on sessions in the Year 1 is explained by the fact that Go-Lab Portal was not available yet.

Project booths (16 events/ 12,619 potential participants):
The project booths were organized and/or leaflets were distributed at the World Science Day organized by UNESCO in Portugal, Scope Days and Salon SwissTECH in Switzerland, EMINENT conference 2015 in Spain, Education Fair INTELLEKTIKA in Estonia, forum "Education and digitalization" and Learning Tradefair Didacta in Germany, Big Bang Fair and "Science at the Stadium" in UK, Long night of research Klagenfurt and Ecsite Annual Conference in Austria, «Integration of ICT in Learning Process» conference on Cyprus, and others.

Synergy actions with related organizations (25 events/ 947 participants)
Go-Lab conducted 25 events targeting 947 participants in cooperation with Scientix, Future Classroom Lab, Global Hands-on Universe, Galileo Teacher Training Programme, AMGEN Teach, STEM Alliance, OnlineLabs4All, and SCOPES projects. Furthermore, Go-Lab was represented at the Summer Schools of Creations and Space Awareness projects. Several events took place in cooperation with IEEE (standardization workshops) and FORGE project.

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 fourth project year, Go-Lab published and submitted (not published yet) 22 scientific papers in conference proceedings, 6 journal articles, and 3 book chapters:

Arriaga, J., Blazquez, M., Castro Gil, M., Quintáns, C., Morales, A., Aguilar, J. D., & Pescador, F. (2016). Centro de Recursos para la Enseñanza y el Aprendizaje de Electrónica. *Proceedings of the 12. Congreso de Tecnología, Aprendizaje y Enseñanza de la Electrónica*, TAEE 2016. Sevilla, Spain: TAEE.
Börner, J., Buraczynska, J., Gärtner, J., Nolte, K., Priesmeyer, J., Üstek, A., Stephan, C., Strasdat, S., Manske, S., Hoppe, & U. Fake or Real? Analyse physikalischer Phänomene in viralen Videos im forschend-entdeckenden Lernkontext. DeLFI 2016 – Die 14. E-Learning Fachtagung Informatik der Gesellschaft für Informatik e.V., Lecture Notes in Informatics (LNI) – Proceedings, Volume P-262. Bonn, Germany: Gesellschaft für Informatik.
Cao, Y., Tsourlidaki, E., Edlin-White, R., Dikke, D., Faltin, N., Sotiriou, S., & Gillet, D. (2015). STEM teachers' community building through a social tutoring platform. In *Proceedings of the14th International Conference on Web-based Learning*, ICWL 2015. Guangzhou, China: Springer.
de Jong, T. Instruction based on computer simulations and virtual labs. In R.E. Mayer & P.A. Alexander (Eds.), *Handbook of research on learning and instruction* (Vol II, pp. 1123-1167). Routledge Press.
Efstathiou, Ch., Hovardas, T., Xenofontos, N., Zacharia, Z. C., & Anjewierden, A. (submitted). Providing guidance in virtual lab experimentation: The case of an experiment design tool. In *Educational Technology Research and Development*.
Gillet, D., Vozniuk, A., Rodríguez-Triana, M.J., & Holzer, A. (submitted). Agile, versatile, and comprehensive social media platform for creating, sharing, exploiting, and archiving personal learning spaces, artifacts, and traces. In *Proceedings of The World Engineering Education Forum*, Seoul, Korea, November 6-10, 2016.
Halimi, W., Salzmann, C., & Gillet, D. (2016). The Mach-Zehnder interferometer: A smart remote experiment based on a software template. In *Proceedings of the 13th International Conference on Remote Engineering and Virtual Instrumentation*, REV 2016, p. 287-292. Madrid, Spain: IEEE Computer Society.

Heintz, M., & Law, E. (submitted). Challenges and resolutions for engaging teachers and students in participatory design of online science learning resources. *Proceedings of the International Workshop on Cultures of Participation in the Digital Age (CoPDA2016)*. In conjunction with NordiCHI 2016, 23-27 October 2016, Gothenburg, Sweden.

Hovardas, T., Xenofontos, N., & Zacharia, Z. C. (submitted). Examining the effect of a hypothesis formulation tool and an experiment design tool on students' learning when using web-based science virtual labs in an inquiry context. In I. Levin & D. Tsybulsky (Eds.), *Digital tools and solutions for inquiry based STEM learning*. Publisher: IGI Global.

Macho, A., Sancristobal, E., Rodr, M., & Castro, M. (2016). Remote laboratories for electronics and new steps in learning process integration. In Proceedings of the 13th International Conference on Remote Engineering and Virtual Instrumentation, REV 2016, p. 112-117. Madrid, Spain: IEEE Computer Society.

Mäeots, M., Siiman, L., Kori, K., Eelmets, M., Pedaste, M., & Anjewierden, A. (2016). The role of a reflection tool in enhancing students reflection. In *Proceedings of the 10th annual International Technology, Education and Development Conference*, INTED 2016, p. 1892-1900. Valencia, Spain: IATED.

Mäeots, M., Siiman, L., Kori, M., & Pedaste, M. (2016). Relation between students' reflection levels and their inquiry learning outcomes. In *Proceedings of the 8th International Conference on Education and New Learning Technologies*, EDULEARN2016. Barcelona, Spain: IATED.

Manske, S., Chounta, I.-A., Rodríguez-Triana, M. J., Gillet, D., & Hoppe, H. U.(2015). 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. Hangzhou, China: Asia-Pacific Society for Computers in Education.

Manske, S., & Hoppe, U. (2016). Concept cloud: Supporting collaborative knowledge construction based on semantic extraction from learner-generated artefacts. In *Proceedings of the 6th IEEE International Conference on Advanced Learning Technologies*, ICALT2016. Austin, Texas: IEEE Computer Society.

Rodríguez-Triana, M. J., Holzer, A., Vozniuk, A., & Gillet, D. (2015). 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: Springer.

Rodríguez-Triana, M. J., Vozniuk, A., & Gillet, D. (2016). Using learning analytics at school: A Go-Lab study. In Proceedings of the Learning Analytics Summer Institute International Workshop, LASI Spain.

Rodríguez-Triana, M. J., Prieto, L. P., Vozniuk, A., Shirvani Boroujeni, M., Schwendimann, B., Holzer, A., & Gillet, D. (in press). Monitoring, awareness and reflection in blended technology enhanced learning: A systematic review. In *International Journal on Technology Enhanced Learning*. *Special issue on: Awareness and Reflection*. InDerScience Publishers.

Salzmann, C., Piguet, Y., & Gillet, D.(2016). MOOLs for MOOCs A first edX scalable implementation. In *Proceedings of the 13th International Conference on Remote Engineering and Virtual Instrumentation*, REV 2016, p. 246-251. Madrid, Spain: IEEE Computer Society.

Schneegass, Ch., Kizina, A., Manske, S., & Hoppe, U. (2016). ConceptCloud: Supporting reflection in the online learning environment Go-Lab. In *DeLFI 2016 – Die 14. E-Learning Fachtagung Informatik der Gesellschaft für Informatik e.V., Lecture Notes in Informatics (LNI)* – Proceedings, Vol P-262. Bonn, Germany: Gesellschaft für Informatik, Bonn

Schwendimann, B. A., Rodríguez-Triana, M. J., Vozniuk, A., Prieto, L. P., Shirvani Boroujeni, M., Holzer, A., Gillet, D., & Dillenbourg, P. (2016). Understanding learning at a glance: A systematic literature review of learning dashboards. In *Proceedings of the 6th International Conference on Learning Analytics & Knowledge*, LAK '16, p. 532-533. New York, USA: Association for Computing Machinery.

Schwendimann, B., Rodriguez Triana, M. J., Vozniuk, A., Prieto, L.P., Shirvani Boroujeni, M., Holzer, A., Gillet, D., & Dillenbourg, P. Perceiving learning at a glance: A systematic literature review of learning dashboard research. In *IEEE Transactions on Learning Technologies* (Vol PP, Issue 99). IEEE.

Sergis, S., Sampson, D. (2016). Towards a teaching analytics tool for supporting reflective educational (re)design in inquiry-based STEM education. In *Proceedings of the 16th IEEE International Conference on Advanced Learning Technologies*, ICALT 2016. Austin, Texas: IEEE Computer Society.
Sergis, S., Vlachopoulos, P., Sampson, D., & Pellicione, L. (in press). Implementing teaching model templates for supporting flipped classroom-enhanced STEM education in Moodle. In Handbook for Digital Learning in K-12 Schools. Springer.
Siiman, L., Pedaste, M., Mäeots, M., Zacharia, Z., & de Jong, T. (submitted). Design and evaluation of an online inquiry learning space to support students' conceptualization inquiry skills. In *Journal of Science Education and Technology*.
Van Riesen, S. A. N., Gijlers, H., Anjewierden, A. A., & de Jong, T. (2016). Supporting planning and conducting experiments. In *Transforming learning, empowering learners: Proceedings of the 12th International Conference of the Learning Science*, ICLS 2016, Vol. 2, p. 823-826. Singapore: International Society of the Learning Sciences.
Vourakis, S., Fassouliotis, D., & Kourkoumelis, C. (2016). An advanced Go-Lab scenario for the GUI-based analysis of large samples of particle physics data. In *Proceedings of the 13th International Conference on Remote Engineering and Virtual Instrumentation*, REV 2016, p. 196-201. Madrid, Spain: IEEE Computer Society.
Vozniuk, A., Rodríguez-Triana, M. J., Holzer, A., & Gillet, D. (2016). Combining content analytics and activity tracking to identify user interests and enable knowledge discovery. In *Proceedings of the 6th International Workshop on Personalization Approaches in Learning Environm*ents, PALE 2016, at the Conference on User Modeling, Adaptation and Personalization, UMAP 2016, p. 42-48. Halifax, Canada: Technical University of Aachen.
Xenofontos, N., Fiakkou, A., Hovardas, T., Zacharia, Z. C., Anjewierden, A., Bollen, L., & Pedaste, M. (2016). Examining the added value of the use of an Experiment Design Tool among secondary school students when experimenting with a virtual lab. In *Proceedings of the 8th International Conference on Education and New Learning Technologies*, EDULEARN2016. Barcelona, Spain: IATED.
Xenofontos, N., Hovardas, T., Zacharias, Z., C. & de Jong, T. (submitted). Problematizing scientific inquiry by linking software scaffolds: The effect of time-on-task and navigation on student performance. In *Interactive Learning Environments*.
Xenofontos, N. Hovardas, T. Zacharias, Z., C., de Jong, T., & Pedaste, M. The impact of a hypothesis formulation tool and an experiment design tool on primary students' inquiry skills when using a Computer-Supported Inquiry Learning Environment [in Greek]. In *Proceedings of the 10th Pan-Hellenic and International Conference ICT in Education*.
Zervas, P., Tsourlidaki, E., Cao, Y., Sotiriou, S., Sampson, D. G., & Faltin, N. (2016). A study on the use of a metadata schema for characterizing school education STEM lessons plans by STEM teachers. In *Journal of Computing in Higher Education*, p. 1-17. New York: Springer US.

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.

In the project Year 4, two papers received the Best Paper Award at the 16th IEEE International Conference on Advanced Learning Technologies (ICALT 2016): the paper entitled "Towards a Teaching Analytics Tool for supporting reflective educational (re)design in Inquiry-based STEM Education" by Stylianos Sergis and Demetrios Sampson (CERTH) and the paper entitled "Concept Cloud: Supporting Collaborative Knowledge Construction based on Semantic Extraction from Learner-generated Artefacts" by Sven Manske and Ulrich Hoppe (UDE). (See Figure 20 on the next page).

Figure 20. Two Best Paper Awards at ICALT 2016.

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 presented 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. The KPI includes number of discussions started by external stakeholders in Facebook, Google+, and LinkedIn groups, number of likes of the Facebook page, number of "retweet" and "favorite" actions on Twitter, number of shares of the website content (via e-mail and social media), and number of likes, comments, shares, and downloads of the content posted on YouTube, SlideShare, and Flickr.	Achieved value Year 1 = 243 actions; this value has been reached with audience = 121 (see K1.3). Thus, average activity per member is 243/121 = 2 (actions per member). This value is valid for new community members, whereas those members being in an online community for some time are usually not as active. Thus, a minimum value of the audience engagement for each following year is K1.5(N) = K1.3(N)*2.

Table 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, Year 3, and Year 4. 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 4 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	**27,468**
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	**No new unique back-links (see comment below)**
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.)	**831 (2,516 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	**730**
K1.5	Audience Engagement	*Own target setting; av. 2 actions/ new member*	-	*254 per year*	*266 per year*	*280 per year*
			243	563	978	**1,137**

Comments:

K1.1: counted using Google Analytics

K1.2: counted using http://openlinkprofiler.org. A unique active backlink means a unique domain, from which a website is linked (however, one domain can contain multiple websites and webpages). In the Year 4, no new unique active backlinks were registered. Currently, there are 89 unique active backlinks leading to the Go-Lab website. However, the number of webpages linking to Go-Lab has increased: in 2016, 1,792 webpages have been registered, in 2015 – 1,158 webpages.

K1.3: 171 Facebook group members + 444 Twitter followers + 64 LinkedIn group members + 69 Google+ group members + 24 YouTube followers + 6 SlideShare followers + 53 newsletter recipients = 831 (excluding project members)

K1.4: 131 Facebook page posts + 182 Facebook group posts + 226 Tweets and Retweets + 10 LinkedIn posts + 147 Google+ posts + 15 own YouTube videos + 16 SlideShare presentations + 3 Flickr albums = 730

K1.5: 427 Facebook page likes + 67 discussions on Facebook started by audience + 470 mentions and retweets on Twitter + 14 likes of YouTube videos + 79 likes, downloads, sharing and embedding actions of SlideShare presentations + 80 sharing actions on the website (unique events) = 1,137

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 presented 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, Year 3, and Year 4. 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 4 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	**133/6,562**
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	**25/947**
K2.3	Publication Number	*DoW*	*10 per year*	*25 per year*	*35 per year*	*45 per year*
			10	16	~~36~~ 33	**31**

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)).

K2.3: In the Year 3, 33 papers/book chapters were published (three articles from Year 4 were counted by mistake). In the Year 4, 31 papers/ book chapters were published or submitted (not published yet).

3. Go-Lab MOOC

The Go-Lab Massive Open Online Course "Using online labs in the classroom: an introductory course for teachers" has been 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, and technical implementation are described in the Deliverable D9.3 "Report of Dissemination and Exploitation Activities, Year 2 (M24)". A detailed description of the course modules with screenshots can be found in the Deliverable D9.4 "Report of Dissemination and Exploitation Activities, Year 3 (M36)". The online course is hosted on the OpenCourseWorld-platform[47] of IMC.

This section presents an overview of the course content and materials, course participant statistics, as well the course evaluation by the participants. The data provided in this section bases on the statistics from the online course platform OpenCourseWorld, participant questionnaire at the beginning of the course (participants' background), as well as participant questionnaire at the end of the course (participants' feedback). Furthermore, at the end of the section we present recommendations we have received from the participants for the improvement of the course and indicate which actions have been taken, particularly in the creation of the updated, final version of the MOOC, which will be available also after the project end.

In 2016, the course was repeated three times. This section provides a summative evaluation of all three course runs. Evaluation of each course run is available in internal project deliverables each devoted to one course run.

3.1 Overview of the course content

The following table provides an overview of the course modules and their content. We do not provide detailed descriptions of the course modules, as they are available in the Deliverable D9.4, as mentioned above. In the sub-sections (later in this chapter) summarizing the evaluation of the modules, we provide a very brief description of each module for reader's convenience.

Table 7. Go-Lab MOOC - content overview.

Module Nr.	Module name	Responsible partner	Presented online labs or tools	Multimedia content
-	Getting started	IMC	-	Introduction to the course, "Getting to know each other" questionnaire
1	Inquiry Learning with Online Labs	UT, EA	-	Introduction, 3 video lectures and 3 additional readings, 2 exercises, 1 link
2	Creating an Inquiry-Oriented Lesson Plan	EA	Go-Lab Portal	Introduction, 1 video tutorial (2 parts) and 4 text documents: video tutorial script (2 parts), Go-Lab ILS Blueprint, Go-Lab

[47] OpenCourseWorld-platform: https://www.opencourseworld.de

Module Nr.	Module name	Responsible partner	Presented online labs or tools	Multimedia content
				Classroom Scenarios Handbook; 2 exercises
3	Creating an Inquiry Learning Space	EPFL	Go-Lab Portal	Introduction, 9 demo-videos, 1 text document (Go-Lab Portal Manual), 2 exercises, 1 link
4	Exploring the Sun	NUCLIO	Sun4All data archive & SalsaJ tool	Introduction, 3 video lectures and 3 video excursions, 2 exercises, 2 links
5	Exploring galaxies	CA	Faulkes Telescope, Galaxy Crash	Introduction, 1 video lecture, 3 demo-videos, video lecture script, 1 exercise, 5 links
6	Identifying Particles with the ATLAS	IASA	HY.P.A.T.I.A.	Introduction, 3 video lectures, 3 video lecture scripts, 2 exercises, 4 links
-	Feedback and certification	IMC	-	Feedback questionnaire, information about certification

3.2 General information about the course runs

The Go-Lab MOOC "Using online labs in the classroom" was designed and developed during the project years 2 and 3. At the beginning of the project year 4 (December 2015), a **test-run within the project consortium** was conducted, after which, in January-February 2016, the course was slightly restructured and some parts of the content were updated. Also, after the test-run, more practical exercises were added to each course module. The comments of the peer-reviewers were carefully documented and analyzed. Those comments, which could not be considered before the planned course launch due to their complexity, were documented as requirements on the final version of the course, which has been created during the Year 4 and is planned to be launched shortly after the project end.

The promotion activities for the course started on January 11th, 2016 via the Go-Lab project website and its news blog, as well as via several posts in the social media networks Facebook, Twitter, Google+ and LinkedIn. The **first run of the course** took place from January 25th until March 7th, 2016. The registration to the course was possible from the official course start date till the end of the course, whereas the course materials remained available for the participants also after the course end. As of March 7th, 2016, the Go-Lab project could record 260 course participants, from which 36 have requested a certification.

The promotion activities for the **second course run** started on March 5th, 2016 and the course took place from April 18th until May 30th, 2016. As of May 31th, 2016, the Go-Lab project could record 159 course participants, from which 9 have requested a certification.

The **third run of the course** had been promoted since July 12th, 2016 and was held from July 18th until August 29th, 2016. As of September 6th, 2016, the Go-Lab project could record 144 course participants, from which 17 have requested a certification.

The course participants were able to request a certification when having completed any five of six course modules. In the first run, 42 persons completed at least five modules, but only

36 sent a request for certification. In the following run, 17 learners completed at least five modules, but only 9 demanded a certificate. And in the third run, 27 persons completed at least five modules and 17 of them requested a certificate. Thus, **15% (86) of the participants have successfully completed the course**, whereas 11% (62) requested a certificate. This rate is higher than the average rate of completion for MOOCs, which is about 7%[48].

Figure 21 represents participants' progress over the course modules, comparing the three course runs that have been conducted. The diagram shows that the progress level continuously decreased from the beginning of the course to its end. The introductory part "Getting started" was completed by 60%-74% of the learners, Module 1 by 42%-51%, Module 2 by 22%-32%, down to 12%-21% in the closing part "Feedback and Certification". The possible reasons for this development are examined in the analysis of the Feedback Questionnaire provided in Section 3.3.3, which contains the evaluation of the modules by the participants.

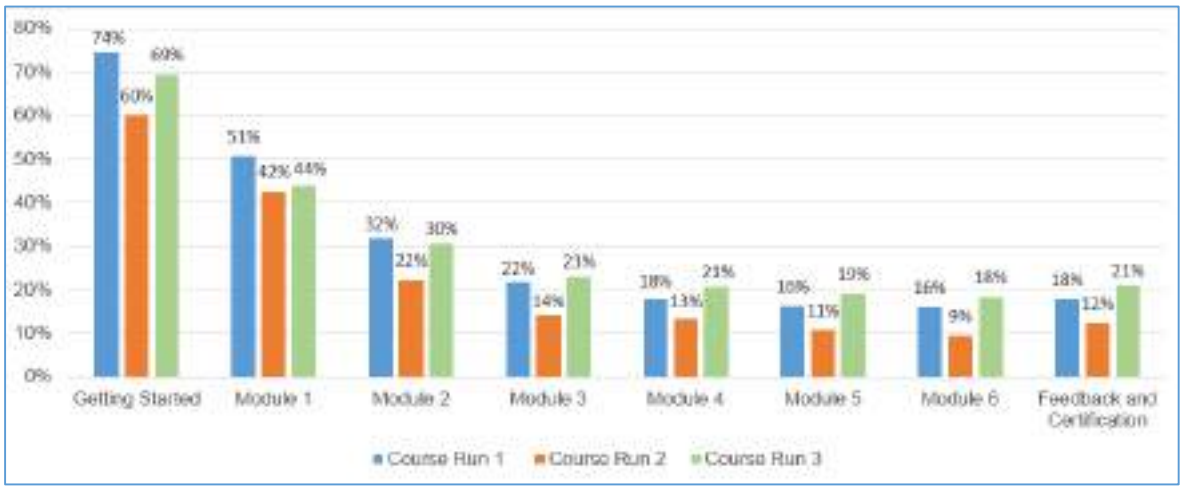

Figure 21. Percentage of participants who have completed each module.

The following section provides information about the course participants as well as their evaluation of the online course.

3.3 Evaluation of the questionnaires

In scope of the online course, participants were asked to fill out two questionnaires, one at the beginning and one at the end of the course. Both questionnaires were created with Google Forms and were accessible via external links provided in the introductory and closing sections of the course. Filling out the surveys was voluntary and was not required to complete the course.

3.3.1 "Getting to know each other" questionnaire

Before starting with the first learning module, the learners were asked to fill out the "Getting to know each other questionnaire" to provide us with information about their previous knowledge about the Go-Lab project and inquiry-based learning as well as about their

[48] Source: https://www.insidehighered.com/news/2013/05/10/new-study-low-mooc-completion-rates

expectations from the course. As of August 31st, 2016, Google Forms recorded 282 participants (50% of all participants in three course runs). The survey had three different parts: “General Data”, “Go-Lab Project and Science Teaching”, and “Go-Lab Online Course”.

3.3.1.1 General Data

Figure 22 shows that two age groups were represented nearly equally strong with approximately 39% each, namely the learners aged between 46 and 55 years (39.4%) and between 36 and 45 years (38.7%). The third biggest age group were people between 25 and 35 years old (12.4%). Only about 8% of the participants were between 56 and 65 years old.

The majority of the people, who filled out the questionnaire, were female (66.3%).

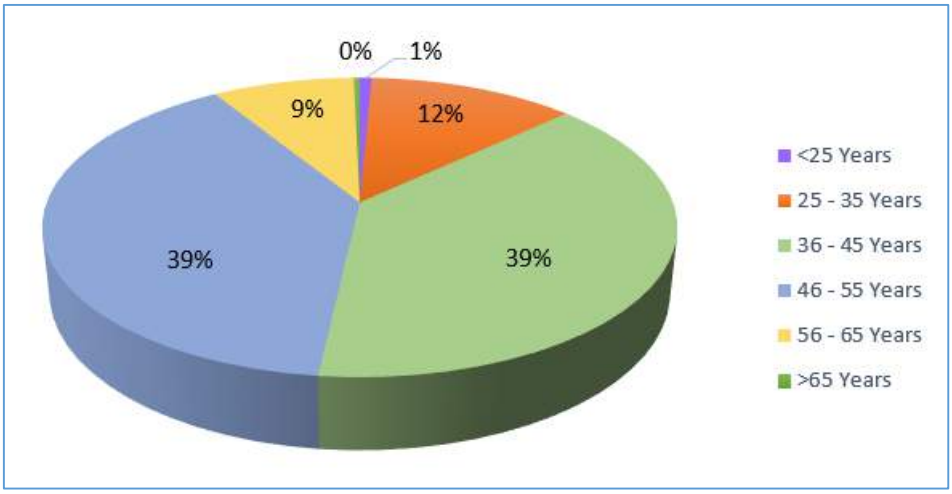

Figure 22. Participants’ age groups.

The surveys were filled out by the participants from around the world. The list of their home countries counted 43 different nations. The three countries, which were represented most frequently, were Greece (12.4%), Romania (10.6%), and Portugal (9.9%). Close behind were Italy and Spain with 7.8% and 6.7% respectively, followed by Croatia (4.6%) and Serbia (4.3%). Most of the participants come from European countries. However, also such countries as Albania, Armenia, Brazil, Canada, Dominican Republic, India, Israel, Malaysia, Morocco, Pakistan, Tajikistan, Uganda, and Ukraine are represented (see Figure 23 on the next page).

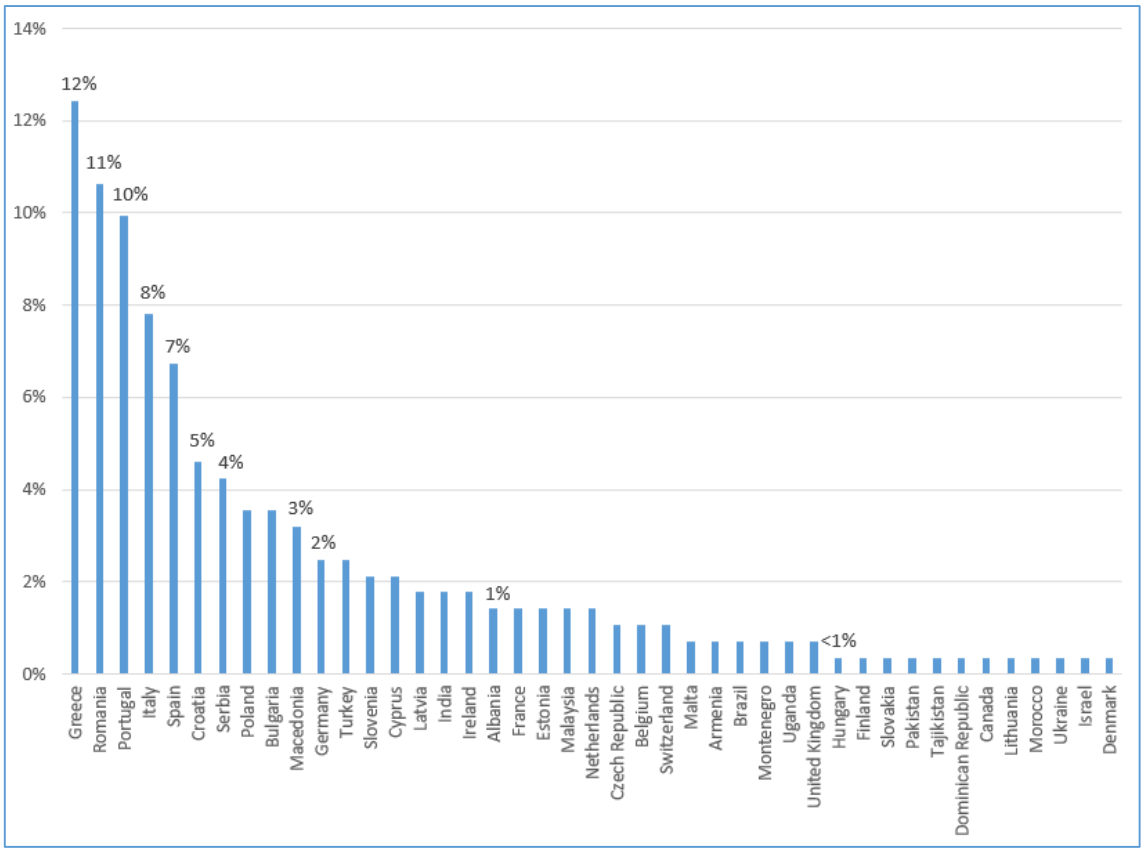

Figure 23. Participants' countries of origin.

Participants from 14 pilot countries took part in the Go-Lab course and made out 65% (183 participants) of participants who filled out the questionnaire.

Figure 24 demonstrates that the majority (approximately 70%) of the participants were teachers in STEM subjects. Nearly a tenth were non-STEM teachers, 6.4% belonged to the category "scientist/technologist/researcher" and 8.2% to the category "other". Only few people were university teachers (3.2%), teaching assistants (1.8%) or heads of schools or school departments (1.4%).

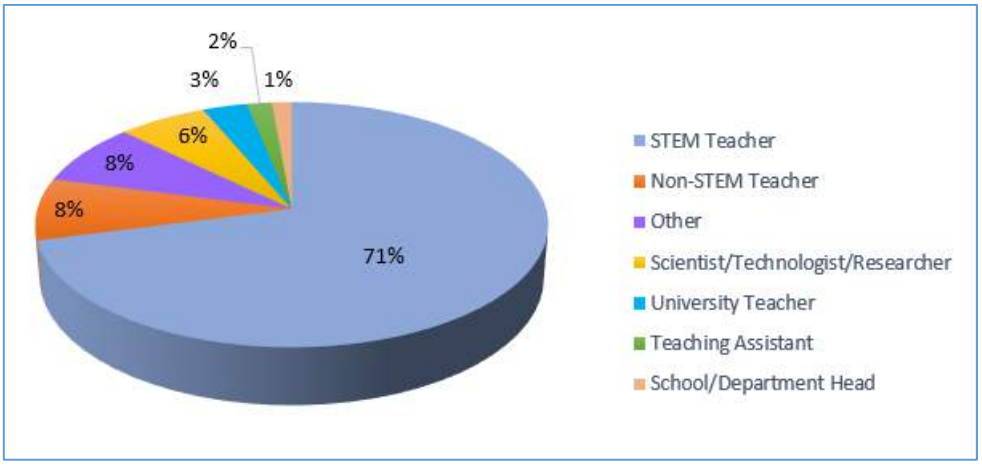

Figure 24. Participants' occupation.

3.3.1.2 Go-Lab Project and Science Teaching

In the second part of the survey, there were a few questions regarding the learners' experiences with Go-Lab, science teaching and the use of multimedia learning tools.

Question A: Do you already know the Go-Lab project and the Go-Lab Portal?

At the beginning of the second part of the questionnaire, the learners were asked if they already have known the Go-Lab project and the Go-Lab Portal. Multiple answers could be chosen[49]. A third of the participants had never heard about Go-Lab before taking the Go-Lab MOOC (31.2%). Another 42.6% have heard about Go-Lab, but didn't know any details. About 21% percent of the participants have previously used Golabz Repository and about 6% have used Graasp. Some 8.2% of the participants attended a Go-Lab workshop. So, most of the course participants were new to the project and the Go-Lab Portal.

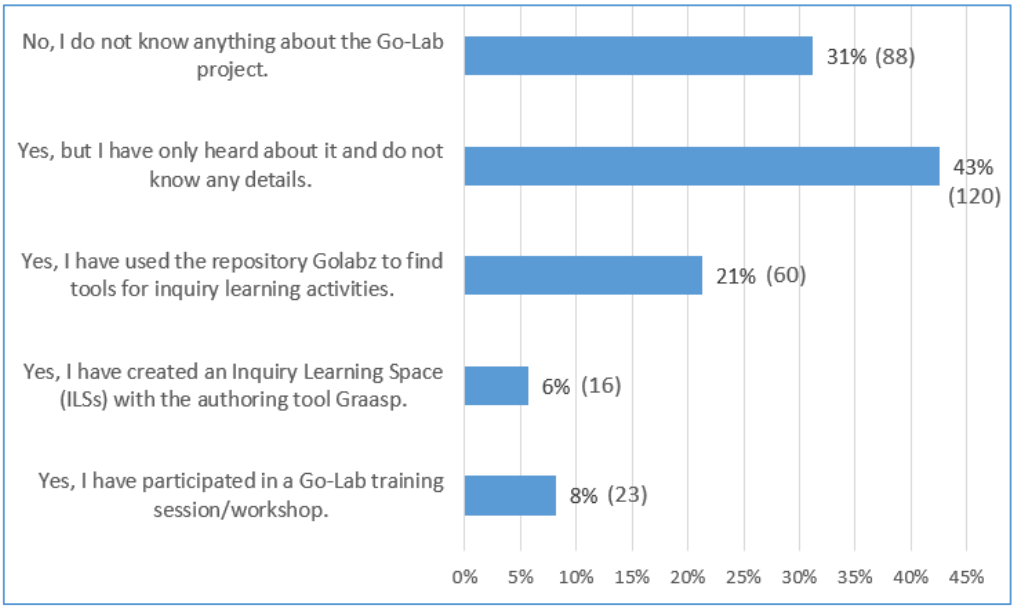

Figure 25. Previous knowledge about the Go-Lab project.

Question B: Have you already used online laboratories and other inquiry learning tools?

Almost 70% of the persons questioned have not used any online labs or other inquiry learning instruments in their lessons before taking the course. Those people, who were familiar with inquiry learning tools, were asked to specify on which websites or platforms they have found them. Based on these comments, in most cases they found online laboratories and teaching tools on the website of the PhET Interactive Simulations Project (35 persons) or in our repository Golabz (16 persons). More than 35 other sources of inquiry-based teaching material were listed, including those from related projects (e.g. Scientix, eTwinning, Open Discovery Space, etc.), project partners (CERN, DEUSTO), and others.

[49] In this diagram, the number of participants who filled in the questionnaire is 100% (282 participants). One participant could choose multiple answers. The diagram should be read as follows: each bulk represents the number of participants (and respectively the percentage from participants who completed the questionnaire) who selected the answer.

Question C: Do you have experience of creating own multimedia learning content and/or learning environments for your students?
67.7% of the participants were experienced in creating their own multimedia learning content and/or learning environment for their students.

3.3.1.3 Go-Lab Online Course

In the last part of the questionnaire we wanted to know the participants' relation to the online course.

Question A: How did you find this online course?
The third part of the survey started with the question where the learners have heard about the online course for the first time. Multiple answers could be chosen[50]. The majority of the participants (39.4%) had read about it in the social media channels used by Go-Lab (Facebook, Twitter, Google+). Roughly about 20% each had found the offer of the online course through recommendation of a colleague (21.6%), or via websites, blogs or social media channels of other European projects[51] (22.3%) or via the Go-Lab website (18.8%). Another source of information had been online or presence workshops, either of the Go-Lab project (2.5%) or of another European project (17.7%). 7.4% of the learners had noticed the course via the Go-Lab Support page and 6.7% via other sources (see Figure 26).

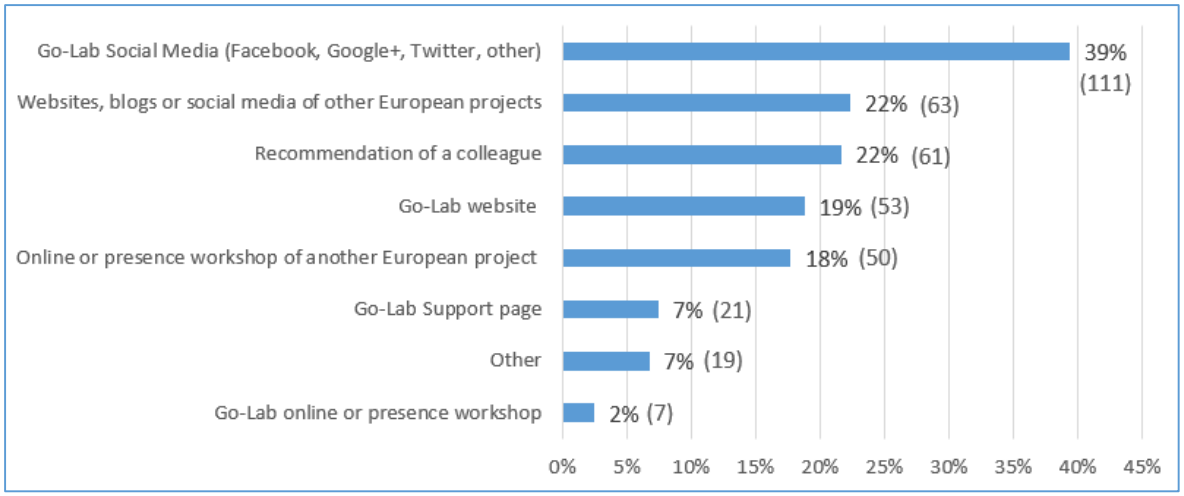

Figure 26. How the participants found the course (total).

In order to analyze how the participant acquisition differs between the three course runs (e.g. if "recommendation of a colleague" or another option plays a bigger role after some people have completed the course), Figure 27 (on the next page) presents the three course runs in comparison.

[50] In this diagram, the number of participants who filled in the questionnaire is 100% (282 participants). One participant could choose multiple answers. The diagram should be read as follows: each bulk represents the number of participants (and respectively the percentage from participants who completed the questionnaire) who selected the answer.

[51] The answer option listed Scientix, OpenDiscoverySpace, Inspiring Science, Future Classroom Lab and eTwinning as examples.

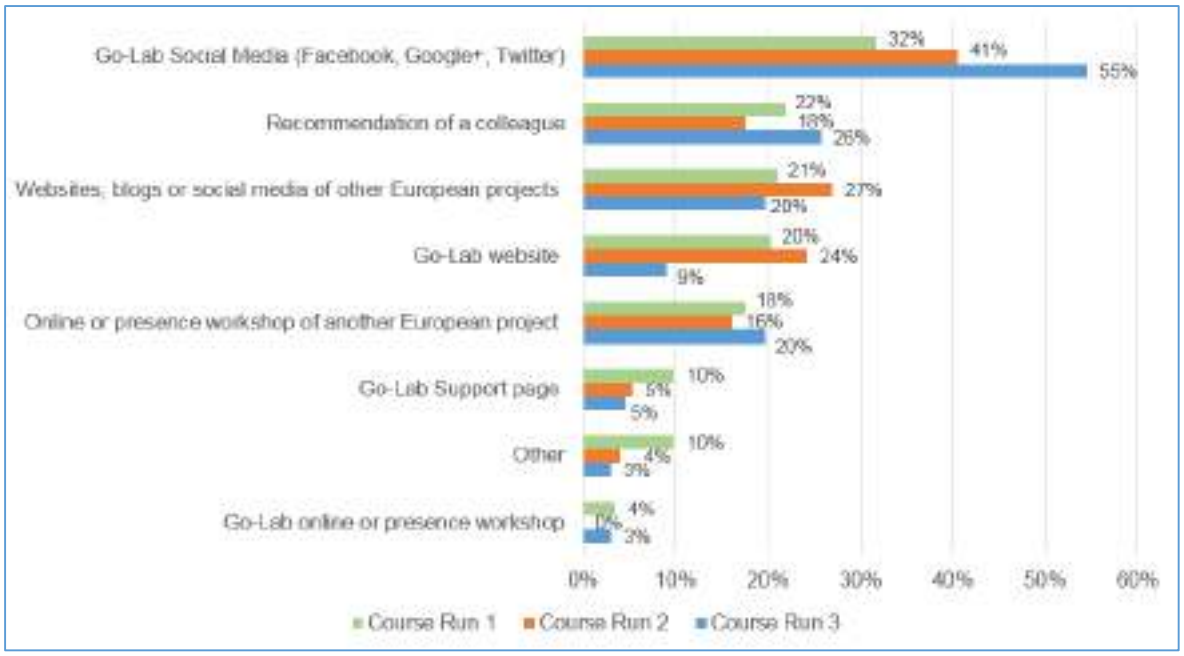

Figure 27. How the participants found the course (per course run).

With most of the sources, there are only small differences related to the different course runs. But very important to emphasize is that the share of people, who had found the course via the social media channels of the Go-Lab project increased with subsequent run from 32% to 55%. Further important points to mention are, that the awareness of the online course via the Go-Lab website decreased from 20% to 9% and via the Go-Lab support page from 10% to 5%. But the recommendations of colleagues increased from 22% to 26%.

Question B: What do you expect from this online course?

Regarding the expectations the participants had from the course, Figure 28 (on the next page) illustrates that more than 60% of the learners (63.8%) wanted to get more inspiration and ideas about what can be achieved in their lessons with the use of inquiry learning resources. About 57% expected to get an advanced knowledge and more experience of implementing their lesson plans in a digital learning environment. Approximately 48% hoped to get an overview about the Go-Lab project itself and its Portal and 44% to increase their knowledge about Go-Lab and about using its Portal. Only 1.8% responded that they did not have any expectations form the course. When answering this question, more than one response could be chosen[52].

[52] In this diagram, the number of participants who filled in the questionnaire is 100% (282 participants). One participant could choose multiple answers. The diagram should be read as follows: each bulk represents the number of participants (and respectively the percentage from participants who completed the questionnaire) who selected the answer.

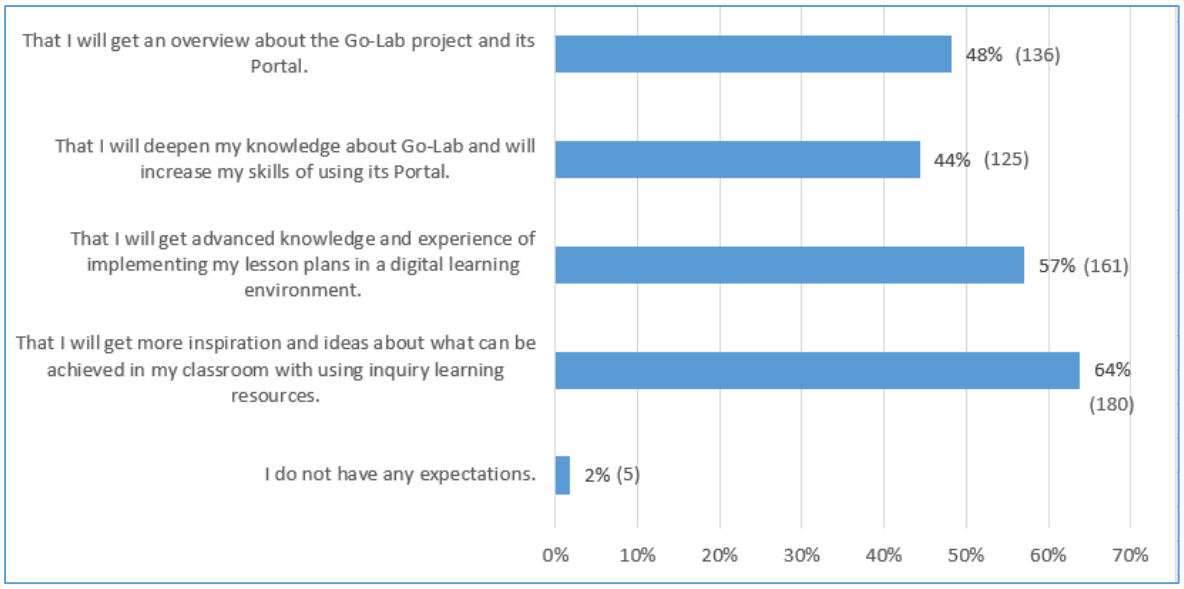

Figure 28. Participants' expectations from the course.

Before starting with the course, the participants had the chance to leave some comments or thoughts regarding the Go-Lab project and the course. 37 comments were written and all can be considered as positive opinions. Most of the learners wrote that they were pleased and thankful to have the chance to learn from the Go-Lab project, to improve and increase their knowledge and experience in science and technology, to enhance their teaching skills and to meet other teachers and extend further collaborations. In addition, they appreciated the possibility to learn online and wanted to improve science education in their school. One learner commented that she/ he wanted to create something new, to develop ideas and experience the use of inquiry learning. Furthermore, some very motivated participants commented that they could not wait to start and that they hoped to increase their skills in creating Inquiry Learning Spaces.

3.3.2 Impact of dissemination activities on the MOOC

As one can see from the analysis above, about 74% of the respondents did not know anything about Go-Lab before taking the course or had heard about Go-Lab, but did not know any details (see Figure 25). Thus, most of the course participants are newcomers. Furthermore, the course participants represented 43 countries from around the world, which means that Go-Lab became wide-spread not only in its pilot countries.

Most of the participants found the course via Go-Lab social media (39%), social media of cooperation projects (22%) or Go-Lab website (19%). Many participants got a recommendation from a colleague (22%) or from a representative of a cooperation project in scope of an event (18%). This confirms the effectiveness of Go-Lab online dissemination (especially via social media), as well as effectiveness of its cooperation with other European projects, such as Scientix, OpenDiscoverySpace, Inspiring Science, Future Classroom Lab, and others.

Finally, 71% of the respondents were STEM-teachers (plus 8% non-STEM teachers and about 1% headmasters), which means that the course was found and attended mostly by the main target group of Go-Lab.

3.3.3 Feedback questionnaire

After having completed the modules of the online course, the participants were asked to fill out a feedback questionnaire before finishing the course in order to give us recommendations and improvement suggestions to enhance our online course. 63 learners took part in this survey (11% of the course participants). Using different charts, the answers to this questionnaire are demonstrated below. As the starting questionnaire, the feedback questionnaire consisted of three parts: “General Evaluation of the Course”, “Evaluation of the Modules”, and “Summary”.

3.3.3.1 General Evaluation of the Course

At the beginning of the feedback form, we wanted the participating persons to assess the course, its structure and content in general.

Question A: Please give your general note to the online course „Using Online Labs in the Classroom”

At first, the learners were asked to evaluate the course with a general note between 1 and 6. The scale runs downwards, with figure 1 representing “very good” until 6 symbolising “unsatisfactory” (2 = “good”, 3 = “satisfactory”, 4 = “sufficient”, 5 = “poor”). As the Figure 29 shows, most of the participants (69.8%) were satisfied with the course, having evaluated it with a 1. 20.6% considered the course as “good”, having given a 2 and 1.6% each regarded it as “satisfactory” having selected a 3 and “sufficient” having selected a 4. Only 6.3% of the responders were not satisfied with the course, having evaluated it with a 5.

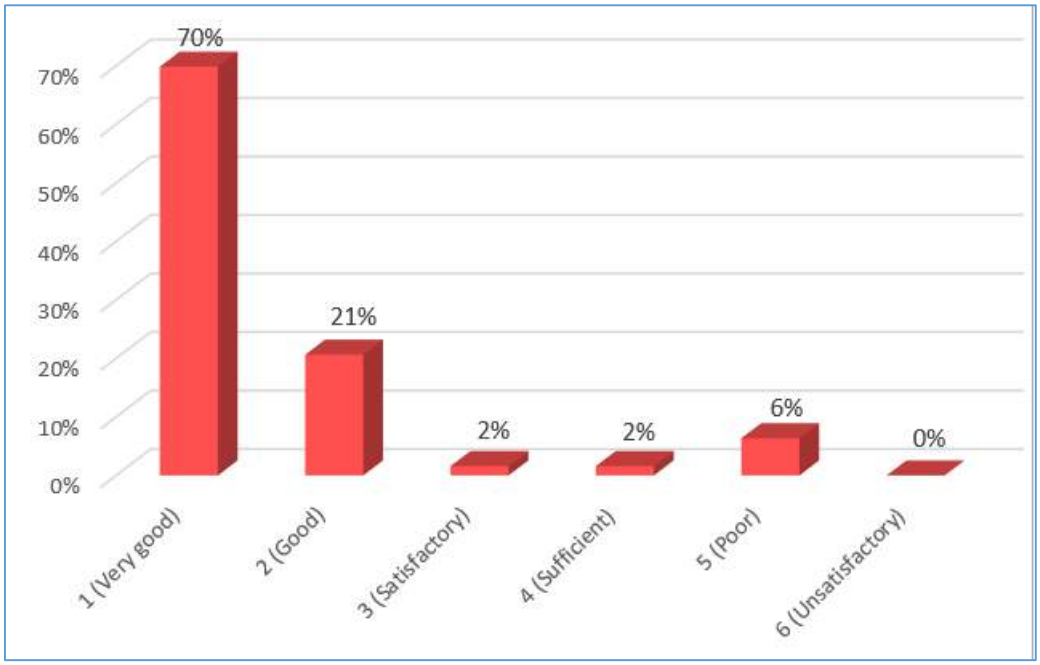

Figure 29. General note of the online course.

Regarding the question, if the course structure and the types of content were supportive for the learning about the Go-Lab project, the participants answered unanimously yes.

Question B: Did the topics of the course modules cover the knowledge areas you were interested in and advanced your knowledge about Go-Lab and your skills of using the Go-Lab Portal?

Figure 30 demonstrates that for roughly half of the learners (47.6%) the topics of the modules covered mostly the knowledge areas they were interested in and have increased their knowledge and skills about the Go-Lab project and its Portal. 42.9% of the participants answered this question with "Yes, absolutely". 4.8% each of the participants rather wished more detailed content or wanted to have additional modules to some topics. Those people, who wished more modules, would like to have some scenarios for students in a lower secondary school (11-14 years), in the fields of biology, biochemistry, chemistry, geology, physics, life science, food production, energy production, and alternative energy as well as a module for learning how to use Go-Lab with the students in class.

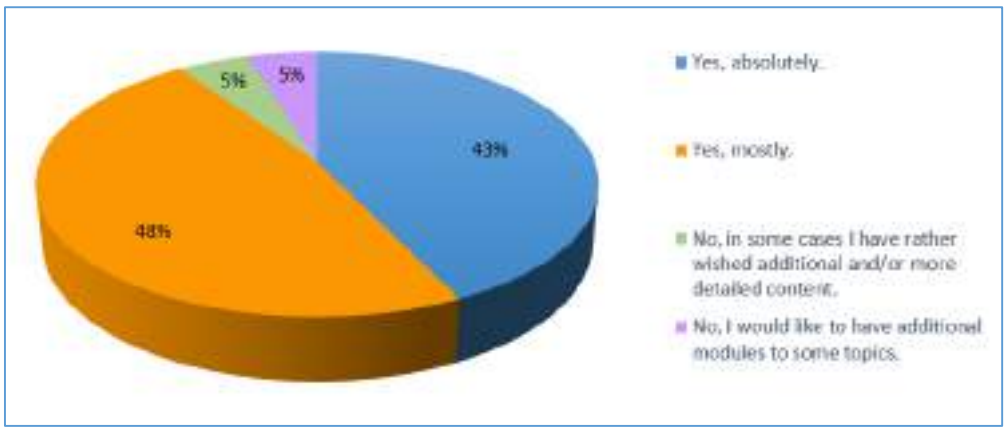

Figure 30. Did the topics of the course covered participants' areas of interest?.

3.3.3.2 Evaluation of the Modules

After the learners have assessed the online course in general, they could evaluate the six single modules with a note at a scale between 1 and 6. The same downwards scaling system (1 meaning "very good" until 6 meaning "unsatisfactory") is applied again. Below each assessment, the participants could leave any comments about the modules.

Module 1: Inquiry Learning with Online Labs

The first module of the course introduced the inquiry-based science education in schools. Main concepts of inquiry learning, as well as its benefits and challenges for school education were presented. The module also gave insight into the teaching practice using innovative tools and future trends in science education.

The majority of the learners (73%) were satisfied with the first module "Inquiry Learning with Online Labs", having rated it with a 1. 22.2% shared the opinion that the course was "good" having given a 2. Only 1.6% of the respondents each considered the module as "satisfactory", "sufficient", or "poor" (see Figure 31 on the next page).

The participants commented that they appreciated the video-lectures, presentations and papers added to the module, as well as the mixture of selected learning materials and that the module was an "excellent job". They also wrote that the module met its introductory purpose, that it was very useful and interesting and that it gave basic guidelines for training

methods and the use of Go-Lab. Furthermore, the participants wrote that Go-Lab allows not only collaboration for students but also for teachers to form a community of good practice and that the inquiry learning method was explained well.

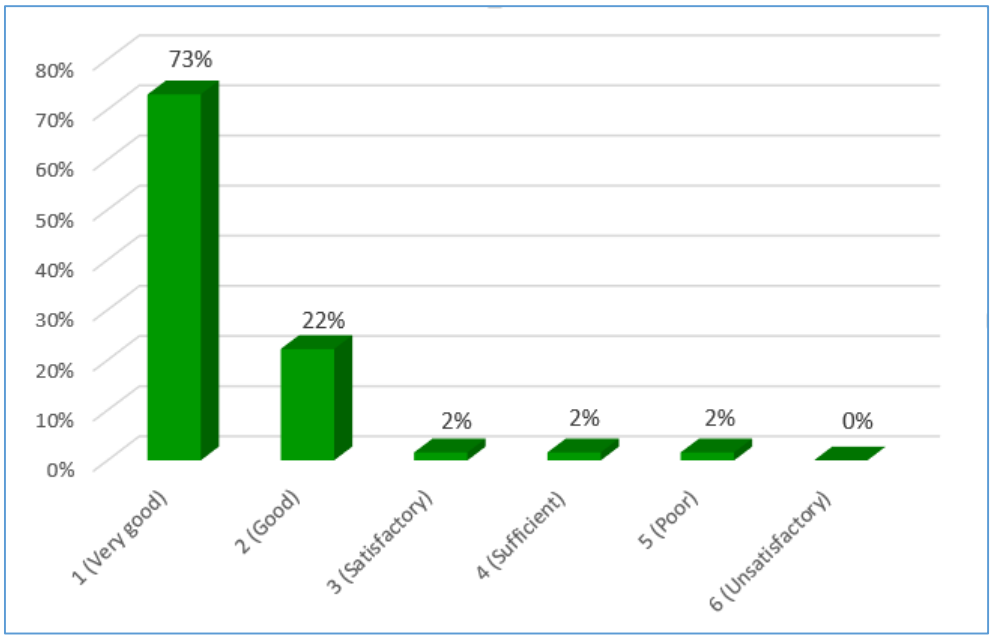

Figure 31. Evaluation of Module 1.

Module 2: Creating an Inquiry-Oriented Lesson Plan
In the second module the participants learned how to incorporate the use of online labs in their classroom activities, how to create lesson plans containing inquiry-based exercises, and how to implement these lesson plans in web-based Inquiry Learning Spaces (ILSs). This module made them familiar with Go-Lab Inquiry Learning Cycle describing the five phases of the inquiry learning process, as well as with a basic pedagogic scenario, which they can use to create a lesson plan. Furthermore, it explained how to start creating an ILS in the Go-Lab Portal.

Regarding this module “Creating an Inquiry-Oriented Lesson Plan”, 72.6% of the learners evaluated it with a 1. About a fifth (21%) assessed it with a 2 and 4.8% thought that the module was only “satisfactory” having given a 3. One person (1.6%) rated it with a 5, considering this module as “poor”. (See Figure 32 on the next page). One learner did not assess this module.

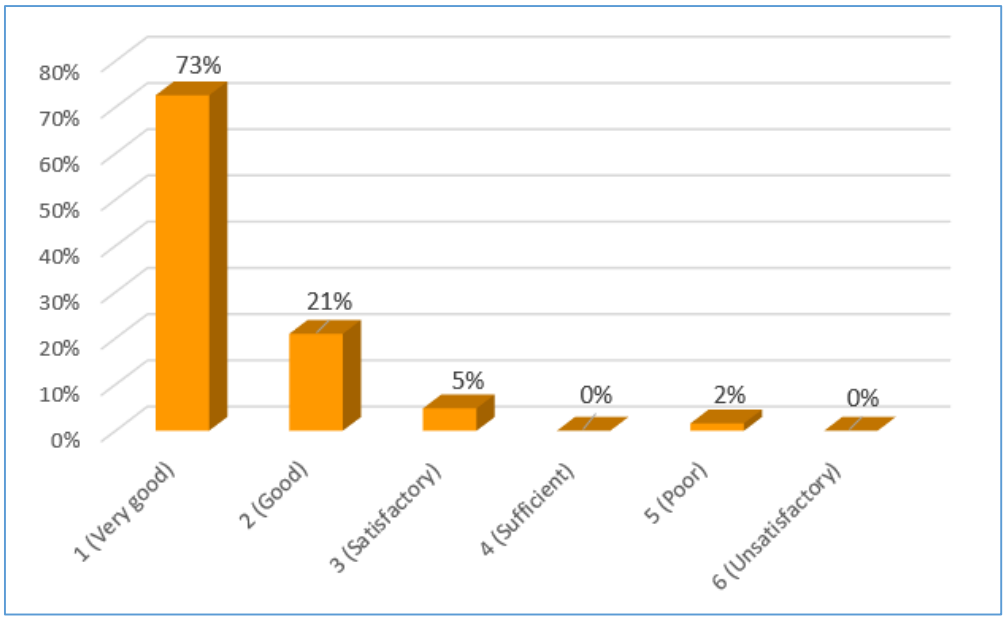

Figure 32. Evaluation of Module 2.

The participating persons commented that the learning materials of this module were very easy, useful and interesting to study. Additionally, using the scenarios and platforms was very effective and a great help for teaching. The learners also wrote that the Inquiry Learning Cycle (ILC) was clear and easy to follow, that the presentations were very good and that the suggestion of preparing a blueprint before creating an Inquiry Learning Space was really useful. Besides that, there were two improvement suggestions. Firstly, to avoid repetitions of contents and secondly, to present a couple of ideal examples (while explaining the glossary, the ILC, and the tools used). This could be followed up by a summary, if necessary.

Module 3: Creating an Inquiry Learning Space

Module 3 “Creating an Inquiry Learning Space” introduced the learners to the Go-Lab Authoring Platform Graasp and gave them a step-by-step guidance in creating an Inquiry Learning Space (ILS). The module contained multiple demo videos explaining both the basics of the ILS creation process as well as the advanced functionalities of the Go-Lab Portal. After studying this module, the participants should be able to create their own ILSs using sophisticated features of the Portal and publish them in the Go-Lab Repository to make them available for colleagues.

The third module “Creating an Inquiry Learning Space” was evaluated with a 1 by 71.7% of the participants and with a 2 by 25%. 1.7% each were of the opinion that the module was only “satisfactory” or “poor”. (See Figure 33 on the next page).

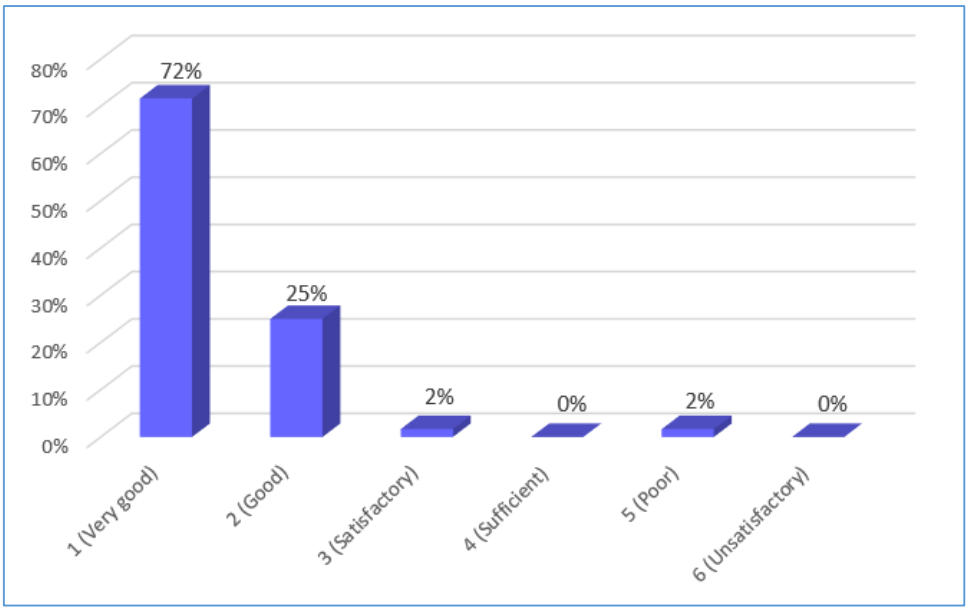

Figure 33. Evaluation of Module 3.

The comments given to this module state that the implementation of the theoretical basics presented in the course and sharing of the ILSs with other teachers appeared promising. The module and in particular the Go-Lab Portal Manual, were considered useful and interesting. Here, the presentations were regarded as very good, too. Additionally, one comment said that the scenario presented with the example of Gears Sketch worked well for the learner in understanding what steps are required in creating an ILS. One participant gave us the hint that there are repetitions of contents.

Module 4: Exploring the Sun

Module 4 “Exploring the Sun” presented the Sun4All Project with its database of solar images collected over the last 90 years and introduced to the use of the SalsaJ tool for the analysis of these images. Furthermore, several videos were available taking the learners on a guided tour through the Observatory of the University of Coimbra in Portugal. These video-excursions demonstrated how a modern spectroheliograph takes solar images and showed some instruments of astronomical investigation in the past.

58.7% of the participants regarded module 4 “Exploring the Sun” as “very good”, 23.8% as “good” and nearly 10% as “satisfactory”. 3.2% of the participants thought that the materials were “sufficient” and 4.8% regarded it as “poor”. (See Figure 34 on the next page).

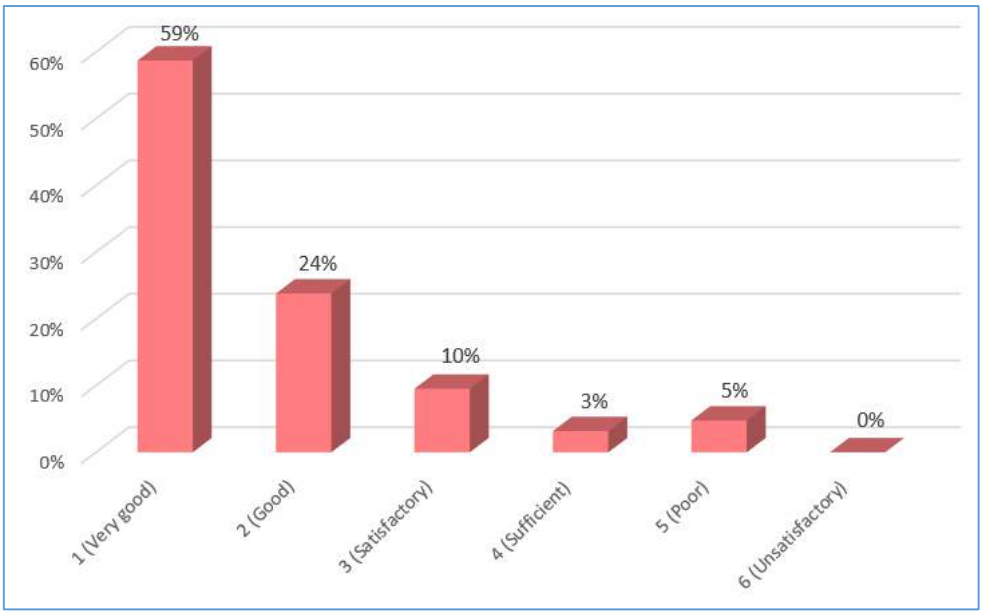

Figure 34. Evaluation of Module 4.

This module caused positive as well as negative feedback and some problems by the users. On the one hand, it appeared to be more like a promotion of the work done at the University of Coimbra in the past rather than a valuable insight into the ideas of Go-Lab of creating learning materials. In addition, teachers could not use the gathered knowledge in this module with their students, because they did not teach such topics or some students with poor English language skills would have problems to follow. In many cases the SalsaJ tool did not work correctly.

One learner commented that for this and the subsequent modules, the online labs and tools are all very fascinating to learn about. But considering that the domain may be unfamiliar to some teachers, additional easy to read articles may help. In her/ his case, the need to finish the course early prevented her/him from spending the effort required to appreciate all these topics. Similar to that, another participant criticized that she/he noticed a lack of slides to understand the subject better. One person of the three, who assessed the module with a 5, stated that she/he was not competent about the subject of the module.

And on the other hand, the module was interesting for the learners, especially the SalsaJ tool for analysing Sun images. The presentations were evaluated as very good, too.

Module 5: Exploring Galaxies
Module 5 “Exploring galaxies” introduced the participants to the Faulkes Telescope Project and to the Galaxy Crash online labs. It was demonstrated how to book an observation session with the remote telescope, how to observe diverse space objects like, for example, galaxies and star-forming regions, and how to take images of them. Additionally, the use of the Galaxy Crash simulation and the integration of these online labs in a pedagogical scenario were demonstrated.

The assessment of the module 5 “Exploring Galaxies” shows that 57.1% of the participants regarded it as “very good” having given a 1, 27% as “good” and 7.9% as “satisfactory”. 3.2%

each of the course participants evaluated the module with a 4 or a 5. One learner (1.6%) rated it with a 6.

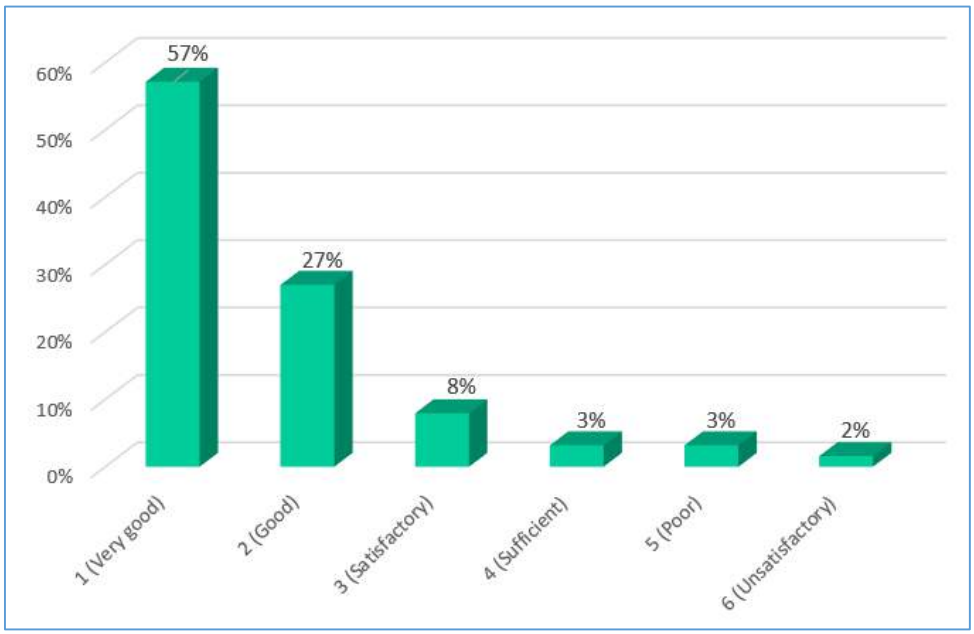

Figure 35. Evaluation of Module 5.

Most of the participants commented that the module was very interesting, but regretted that it was too difficult for them and their students. Moreover, the Galaxy Crash App needed java software to run and could not be run on any device. The presentations were praised. Again, one learner wrote that she/he was not competent in this subject and rated the module with a 5. It was the same person as described in module 4, so it can be assumed that she/he assessed module 5 again with “poor” because she/he could not work through the materials because of the lack of knowledge in the domain itself.

Module 6: Identifying Particles with the ATLAS
In the last module “Identifying particles with the ATLAS” the Hybrid Pupils' Analysis Tool for Interactions in ATLAS (HYPATIA) was presented. The video lectures of this module provided an introduction to the HYPATIA online lab and two learning scenarios (“Discover the Z and Higgs bosons” and “The motion of a charged particle in the ATLAS magnetic field”), which could be completed with this lab. Some demo videos were incorporated into the lectures to facilitate the handling of this comprehensive tool.

Most of the learners evaluated the last module “Identifying Particles with the ATLAS” with a 1 (61.3%). 22.6% assessed it with a 2 and 9.7% rated it with a 3. One learner each (1.6%) rated the module as “sufficient” or “unsatisfactory” and 3.2% thought that it was “poor” (see Figure 36 on the next page).

This module was too difficult for some users and could not be used in class, but the participants considered it as very useful and interesting, in particular the ready-to-use scenarios (ILSs). The presentations were assessed as very good. Again, as in module 4 and 5, one person was not competent in the subject (the same person as in the two previous modules).

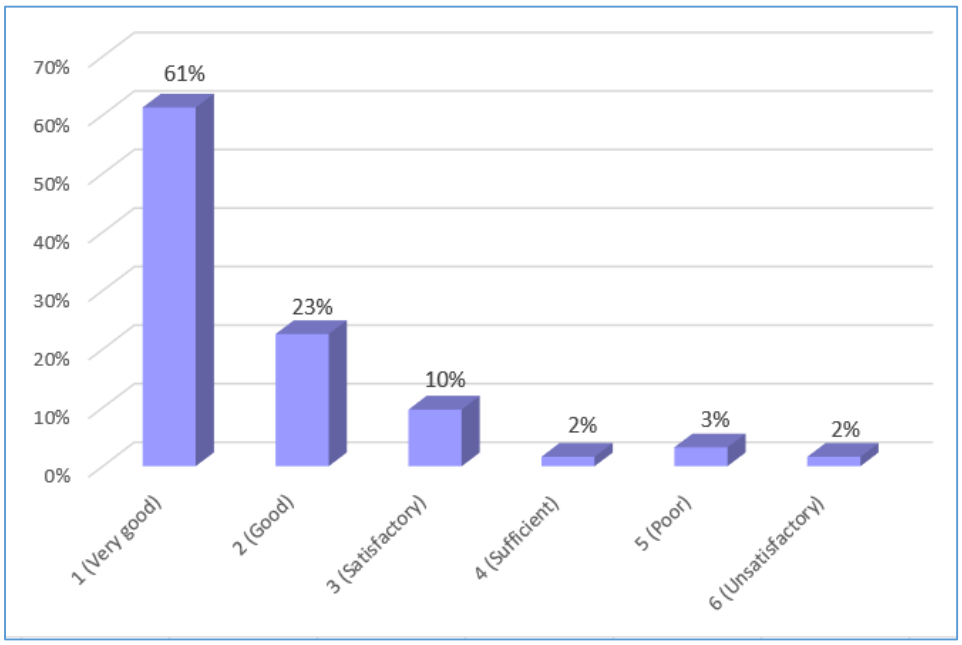

Figure 36. Evaluation of Module 6.

Also, one person assessed all modules with a 5 or a 6, but was satisfied with the course in general and said she/he was going to use the Go-Lab project and its resources in class in the future. This could be caused by a misunderstanding due to the grading scale, which can be used vice versa in some countries.

3.3.4 Impact of the MOOC on dissemination

In the last part of the feedback questionnaire, we asked the participants if their expectations have been fulfilled. About 96% answered this question with yes and all of the respondents stated that they are going to use the Go-Lab project and its resources in future classes or other contexts.

The learners were asked to leave their final comments to the course in order to give us some recommendations for the course improvement. These comments comprised different areas, for example:

- Participants wrote that the course was great/ excellent/ useful/ a good experience, and delivered many interesting things to learn and apply in class. Furthermore, the scenarios were praised to be described very well and the course as a whole was considered as well organized and presented. They thanked for the provided information and options.
- One user had heard about the project at its very beginning but she/he did not explore it further. But, through the participation in the online course, she/he became very enthusiastic, especially about the ILSs, and would like to contact us and promote some ideas presented and elaborated in the Go-Lab project among teachers and students.
- One learner commented that the course contents will be a path to follow while planning any Inquiry Learning Space.
- One person hoped that the project will continue after the fourth project year.

- Another learner wrote that she/ he liked very much the first part of the course, but the last three modules were too advanced for what she/ he usually teaches. She/ he preferred more practical exercises, like creating ILSs herself/ himself, and would welcome the opportunity to collaborative learning with other course mates, so that they could develop their ILSs, share them among each other and review them together.

Here, we would like to present some of the learner's comments:

- *"It's the most interesting project which I already know!!"*
- *"I think Go-Lab is the most efficient use of ICT in education and that presents the future of education in all stages from preschool to university level."*
- *"The course is well organized and presented, which helped me to accept the new knowledge quickly. I intend to use Go-Lab platform for many activities."*
- *"It was a great course for me. There are many interesting things to learn and applied to the class."*
- *"It has been a very good experience. I hope to have new opportunities to better know Go-Lab. May be a new MOOC about Go-Lab? I really Hope!!!"*

The Go-Lab MOOC provides a positive impression about the project and positive experience of using its resources to the participants, who will probably recommend Go-Lab and the course to their colleagues in the future and can even become active disseminators of Go-Lab ("Go-Lab Ambassadors"). Furthermore, after the course, the participants are able to implement Go-Lab in the classroom and can assist their colleagues in discovering Go-Lab. Finally, the Go-Lab MOOC can become a tool for collaboration and exchange between teachers. For its final release, collaboration tools (such as discussion forums for each module) will be provided within the course.

3.4 Improvements for the final release

After having evaluated the feedback from the consortium members during the test-run and from the participants during the first and second course runs[53], some improvement suggestions for the final course release have been formulated. The course structure, content of the different modules, as well as possible additional modules have been considered. The following list provides a brief overview of the improvements:

- Module 1 (Introduction): update of the videos with new slides and screenshots representing up-to-date user interfaces of the Go-Lab Portal
- Module 3 (Go-Lab Portal): revision and update of the structure and the content (demo-videos) of the module according to the current status of the Go-Lab Portal
- Module 5 (Faulkes Telescope and Galaxy Crash): adding subtitles to the video lecture, as it appears to be too difficult for some participants; adding tips on the use of Java-based labs (in text form)
- New module: a new module devoted to setting up and handling of inquiry learning apps (the new module has been created based on the demo-videos developed in WP6)

[53] The third course run has not been considered, as the implementation of improvements, e.g. development of new content, has already started by the time the third run finished. Also, as the third run finished at the end of August, there was no time to plan and implement changes.

- New module: a module on a topic other than astronomy and explaining scenario suitable for younger students (the new module is being created around the “Craters on Earth” online lab, presenting a relatively simple scenario in planetary science, as well as an interdisciplinary scenario in planetary science and biology)

All these improvements have been considered and are being implemented in the final version of the MOOC, which will be launched at the beginning 2017 (currently the last changes to the course contents are being made; a test-run within the consortium is planned). The new course will be available for self-study (no course runs will be conducted; registration will be possible any time) for at least one year after the project end. If there is enough interest, the course will be available for a longer time.

4. Sustainability and 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, educational resources, and support. To achieve this goal, it is crucial to assure the sustainability of the project results, their further development and update, as well as their dissemination among the target groups in a long-term perspective.

This section provides a report on the exploitation activities conducted in the Year 4 (such as collaboration with different groups of potential customers and actual end-users) and reflects on and revises the business model proposed in the Deliverable D9.4 “Report of Dissemination and Exploitation Activities, Year 2 (M36)” based on the outcomes of these activities. Further, we describe how we have assured the sustainability of the project results in the mid-term and which steps have been made towards the development of a commercial product. Finally, we present the exploitation plan, which goes beyond Go-Lab lifetime and will be implemented by the key consortium members.

4.1 Collaboration with the target groups

In the Year 3 (see Deliverable D9.4, Section 3.1.2), we have identified three main customer segments for free and paid use of the Go-Lab product and services:

1. Schools, represented by headmasters as decision makers and science teachers as end-users, plus Ministries of Education as sponsors for schools.
2. Organizational educational providers, like universities and online course providers (with instructors and course authors as end-users).
3. Private tutors and student parents (individual customers segment).

In the Year 4, we conducted a number of activities to validate the business model proposed in the Deliverable D9.4. We checked the feasibility of addressing and involving new target groups (organizational educational providers and individual customers). Also, we collaborated with the representatives of our main target groups (Ministries of Education, headmasters, and teachers) in order to find out about their expectations on the product and services, purchase power, decision process, motivation, and obstacles. The sections below represent the conclusions from our work.

4.1.1 Focusing on the main target groups

At the first step, we have analyzed the effort to attract new customer groups (numbers 2 and 3 above) and the product(s) and services we can offer them.

To address organizational customers (universities, online course providers) the following activities have to be conducted:

- Marketing and sales activities (including cold acquisition) to address this target group and to attract first (pilot) customers.

- Providing additional set of online laboratories and tools suitable for university students and adult lifelong learners.
- Developing an online booking and payment system in the Go-Lab Portal.
- Providing consulting services, user training, 24/7 online support, etc.

To attract individual customers (private tutors and student parents), the following activities need to take place:

- Marketing and sales activities in the individual customer market. This includes identification of appropriate communication channels and possible selling points, varying across different countries, building up a marketing and selling infrastructure.
- Developing an online booking and payment system in the Go-Lab Portal.
- Providing training and 24/7 online support.

Activities listed above (which are by far not a full list), would require significant financial and human resource investments (e.g. for the development of additional features, marketing materials, sales and support personnel, etc.), which go far beyond the project budget (and scope) or the possibilities of individual project partners. Therefore, we took the decision to discard the related part of the exploitation model and concentrate on the main target groups of Go-Lab, which are:

1. School teachers, as the main end-users of the Go-Lab Portal and related services
2. Headmasters, as the decision-makes for their schools, incl. decisions about software purchase and teacher training (incl. distribution of the budget)
3. Ministries of Education, as potential sponsors for schools and teachers

During its duration of four years, the Go-Lab project reached a critical mass of users (more than 1,600 science teachers), who use the project results in their teaching activities and contribute to promotion and dissemination of the project among their colleagues. Furthermore, we have addressed headmasters and representatives of the Ministries of Education in different European countries in order to facilitate their support for Go-Lab implementation in schools. Finally, we conducted some activities in order to validate the business model proposed in the Deliverable D9.4 for these target groups. These activities are reported in the sections below.

4.1.2 Collaboration with headmasters and teachers

4.1.2.1 Go-Lab Sustainability Workshop with teachers

In June 2016, IMC together with ULEIC, EPFL, and UT conducted a workshop (“Go-Lab Sustainability workshop”) with experienced Go-Lab teachers in scope of the 9th Science Projects Workshop in the Future Classroom Lab (organized by EUN, June 03rd-05th, 2016). The aim of this workshop was to receive feedback from teachers to the sustainability and exploitation model proposed by Go-Lab in the Year 3 (see Deliverable D9.4).

The main question we stated at the beginning of the workshop was “How to make platform sustainable, if it has to be free of charge for the main target group?” In order to answer this major question, we have formulated another three sub-questions which would lead us to the answer.

The workshop was organized as follows. The participants were divided into four groups, four people in each. Each group was accompanied by one facilitator from the Go-Lab consortium to support the group discussion. After the introduction to the workshop made by the moderator, the participants were first presented with two short questions, which they discussed in the groups and then articulated their answers, so the moderator could write them down on a flip chart and summarize. Answering each question took about 15-20 minutes. The last (third) question was planned as a task to be completed in small groups as well, however, due to the dynamic in the whole participant group, it was discussed in a big round during about 50 minutes.

In the following, we present the questions that were discussed and summarize our findings.

Question 1 (15 min): What makes Go-Lab different from any other platforms supporting inquiry learning in schools? What are our advantages against other platforms?

This question aimed to find out which features of our product are perceived most positively by the end-users, in order to formulate our competitive advantage.

Positive features related to pedagogical aspects:

- Pedagogical theory and model behind the software
- Structured learning activities prepared for students by the teacher
- Students are guided through the process to solve scientific problems
- Virtual hands-on activities are engaging and motivating for students
- Link to best practices and modern developments at universities

Positive features related to the software:

- Big variety of resources and tools
- Good filtering function to search resources by student age, subject, language, etc.
- Most ILSs provide complete lesson plans, already including various tools
- Possibility to create own ILSs. Easiness of putting an ILS together: by navigating through the system, locating needed tools, structuring the ILS, populating it with resources, publishing, etc.
- ILSs are easy to use for students (easier than other platforms!)
- Materials are available in several languages and further translation is possible
- The ILSs can be previewed, checked, and tested before use
- Teachers can check students' work and understanding remotely (which is time saving)
- Time saving though the possibility to reuse ILSs again and again
- Safety on the internet for students (no spam, no external people)

Positive features related to collaboration and support:

- Possibility to share own ILSs and use ILSs of other teachers
- Possibility to produce an ILS collaboratively (e.g. teachers and technicians)
- Teachers can design ILSs for other teachers; easy to find new ideas
- A lot of demonstration material and templates
- Forum to gain help from technical support and teachers
- Good and fast support (via contact form)
- Go-Lab MOOC for teachers
- Good social media contacts

Based on the answers provided above, we can formulate the **competitive advantage** of Go-Lab as follows: Go-Lab provides a pedagogically sound infrastructure for creation, sharing, and publishing of customized learning spaces, populated with innovative tools for inquiry learning, and providing guidance for students through the inquiry learning process. Furthermore, Go-Lab provides collaboration possibilities for teachers, as well as online training materials and fast online support for teachers.

Question 2 (15 min): As the end-user, what do you think has to be improved? Are there any critical functionalities or services missing? (e. g. search for labs and apps, available tools, creating & customizing ILSs, guidance for students, etc.)?

This question aimed to figure out which features of the system have to be improved in order to better correspond to the needs and expectations of the target group.

Improvement suggestions related to available tools:

- Add more online labs and apps for math, biology, chemistry
- Add resources for nanotechnology
- Add more online labs, apps, and ILSs for primary school
- Highlight popular ILSs for primary and lower secondary school

Improvement suggestions related to the system:

- Add functionality to rate and comment ILSs (a kind of “tripadvisor”)
- Use Google-maps to locate ILS creators & use of ILSs
- Provide a tool for collaborative team work and recording progress (like http://teamup.aalto.fi)

Improvement suggestions related to reuse of the materials:

- Provide a possibility to print ILSs, so they can be attached to documentation of classroom activities and serve as learning material for other teachers
- Provide a possibility to download resources and use them offline
- Provide a possibility to backup and reuse the scenarios
- Provide a possibility to embed materials into a blog

Suggestions related to sustainability:

- Make the platform sustainable
- Provide a possibility to add school logo and student information

Thus, the main desired improvements relate to the availability of a bigger variety of tools suitable for different subjects and age ranges, possibility to store and use the resources offline, as well as print them, availability of a rating and commenting functionality for ILSs to simplify the search for appropriate high-quality scenarios, as well as sustainability of the platform. (See Section 4.2.1 for the action points foreseen in the follow-up project Next-Lab).

Question 3 (50 min): For which features we could charge (what is worth paying)? Who would be the customer? (Ministries of Education/ schools/ teachers/ parents)?

This question aimed to collect comments on the current situation in schools, the decision making process, and expectations on a potential commercial product.

Comments regarding possible commercial products and services:

- Additional technology: ILSs to work with technology using sensors
- Additional technology: ILSs to work with interactive whiteboard clickers
- Wrapping content: Package of questions or ILSs
- Wrapping content: Package of ILSs for national curriculum

- Wrapping content: Textbook + USB stick incl. materials and tools
- Service: Training (for teacher trainers also)
- Service: Support 24/7

Comments on the possible customer groups (potential buyers):

- Go-Lab should remain free for teachers and schools
- Funding/donations/shared economy models are possible
- Comments related to teachers:
  - Teachers cannot pay for tools and services (all participants agreed on this)
  - Teachers could pay a small amount for resources (like 5€ or 10€ a year), if the resources are really time-saving (in terms of preparation for a classroom activity). This can be a ready-to-use set of lesson plans and worksheets adopted to national curriculum. (Only 2 or 3 teachers of the group of 16 experienced and engaged teachers shared this opinion).
  - Freemium model: copy X ILSs per month for free, copy more at a charge (suggested by one participant, not supported much by the others)
- Comments related to schools:
  - No financing/budget for tools and support are available in schools (all participants agreed on this)
- Comments related to Ministries of Education:
  - Organization is different across countries, so it is difficult to say which exploitation model would work where
  - It is common for all countries that schools have no budget for the software and teachers are also not able to pay for anything, even a small amount
  - Every teacher requires different software, which makes the decision difficult for the headmasters. A specific common set of software is needed
  - Thus, Ministries of Education have to provide a guideline or recommendations on which software to use in schools
  - Ministries of Education have to allocate budget for such software and services

From the comments above, we conclude that the only target group that can be considered as a potential customer (buyer) is the Ministries of Education in different countries. Thus, a product has to be created, based on Go-Lab (but not excluding free use of Go-Lab by individual teachers), that can be offered to the Ministries. (See Sections 4.2.3 and 4.3.3 for the action points foreseen in the spin-off project SiWay).

4.1.2.2 Event for headmasters

In the Year 4, several dissemination events for headmasters took place. For example, in scope of the 9th Scientix Project's Networking Event, an introductory workshop and a hands-on workshop for headmasters were given. These people were new to Go-Lab and they liked the project idea and the Go-Lab Portal very much. The main feedback (after the workshop and several small talks in the break) was that such system could be very useful for their schools. However, no exact discussions of the implementation or possible financing took place (as this can only be done with more experienced users, not the novices).

4.1.3 Promotion to the Ministries of Education

4.1.3.1 International collaboration

In the Year 4, EUN has utilised all available channels in order to demonstrate the use, benefits, and impact of Go-Lab on teachers and students from all over Europe to the Ministries of Education (MoEs), in order to mainstream the project and support its centralised implementation in different countries[54]. Efforts have been made to provide to the MoEs enough evidence, success stories, and teachers' insights, on which ministries can base policy recommendations that will lead to a wider use of Go-Lab. This work has been done by using two different channels:

- Ministries of Education – STEM representative working group
- Individual meetings or communication

The Ministries of Education – STEM representatives working group has been launched by EUN in January 2016. The main aim of this working group is to provide MoEs with a stable platform for discussion and exchange regarding their STEM education policies. The working group aims also to provide MoEs with the opportunity to ensure the sustainability of the results already achieved by both European Schoolnet and the Ministries of Education and to guarantee a leadership position in future actions jointly organised.

The first meeting of this working group took place on 17th of March 2016 in Brussels with the participation of 11 MoEs from the following countries: Austria, Belgium (Flanders), Belgium (Wallonie), Estonia, France, Lithuania, Malta, Portugal, Spain, Sweden, and Turkey. During this half-day meeting, MoEs have been presented with Go-Lab's main outcomes and achievements, while they also had the opportunity to ask questions regarding practical aspects of the project and the possibilities for their teachers to get involved in the various activities. Malta and Lithuania representatives, in particular, have expressed special requests that the EUN team had to address.

The Maltese MoE has presented Go-Lab at the "Teacher Education from a Global Perspective" conference, which took place in Malta from 19th to 21st of May 2016. Information, material, and some initial evaluation results have been provided by EUN to the MoE, who took care of their dissemination throughout the conference. The idea at the moment is to include Go-Lab in the list of suggested tools for both primary and secondary schools, which the MoE communicates to schools twice a year. A selection committee is working on the selection of these tools, so the selection results will be made available at the end of 2016.

Lithuania, on the other hand, is looking for possible solutions allowing the introduction and use of online laboratories in primary schools. Communication has been established with the MoE responsible for this internal project, in order to investigate what Go-Lab can offer in this direction. An update on this development is expected around November 2016.

[54] It is important to underline that on the MoEs side, decision-making is a long and complicated process, whose duration and final actions rely solely on the respective MoE. Introduction of a new pedagogical paradigm and respective teaching methods and tools needs a number of decisions related to educational policy of the country, allocation of budget, and change procedures. Organizations such as EUN can only introduce the new approaches and technologies to the MoE representatives and suggest their promotion and implementation at the national level. However, it is not possible to influence the decision or policy of MoEs.

A second meeting of the Ministries of Education – STEM representatives working group will take place in November 2016. During this event, selected teachers will be invited to present projects that had a positive influence on their work, directly to MoEs. Go-Lab will be one of these projects.

Additionally, Go-Lab had its own booth during the Eminent 2015 conference, organised by EUN, in November 2015. Eminent 2015 was focused on Science, Technology, Engineering and Maths (STEM) in Education and Life and was organized in collaboration with Scientix, the community for science education in Europe, as well as the Department of Education of Catalonia. The collaboration with Scientix impacted the number of participants (increasing it from about 150 to 260 people) and the content (with the inclusion of booths, workshops, and presentations on STEM education issues). This way Go-Lab representatives from NUCLIO and EPFL got the opportunity to network with teachers, policy makers and MoE representatives.

Moreover, the following face-to-face meetings or direct communication with MoEs took place:

Table 8. Direct communication with MoEs.

MoE	Action taken/ Follow up action (if any)
Flemish MoE: Education and Training Division of Horizontal Policy	Face to face meeting, 14.01.2016 The main topics on the agenda were • the aims and possible outcomes of Go Lab • the timing and current state of affairs • involvement of Flemish schools • Flemish MoE involvement in dissemination and attracting more schools. EUN has provided an overall update on all points and a number of joint actions have been agreed including the dissemination of the project results to schools and headmasters through the MoE main portal and social media accounts, along with the investigation of possible integration of Go-Lab repository to https://www.klascement.net
Spanish MoE: Head of European Projects	EUN brought MoE representative in touch with the Go-Lab National Coordinator in order to investigate possible joint actions, further dissemination of the project, etc.
Swiss MoE: Swiss Media Institute for Education and Culture	EUN brought MoE representative in touch with the Go-Lab National Coordinator in order to investigate possible joint actions, further dissemination of the project, etc.
Austrian MoE	EUN brought MoE representative in touch with the Go-Lab National Coordinator in order to investigate possible joint actions, further dissemination of the project, etc. Participation in the selection of Austrian schools for Pilot phase C.
Estonian MoE	EUN brought MoE representative in touch with the Go-Lab National Coordinator in order to investigate possible joint actions, further dissemination of the project, etc. Participation in the selection of Estonian schools for Pilot phase C.
Netherland MoE	EUN brought MoE representative in touch with the Go-Lab National Coordinator in order to investigate possible joint actions, further dissemination of the project, etc. Participation in the selection of Dutch schools for Pilot phase C. Kennisnet representative approved selected Pilot schools.
Slovakian MoE	Presentation of Go-Lab to Slovakian MoE representative as a part of a more general presentation of STEM initiatives. Go-Lab has been included in communication to Slovakian secondary schools among others quality tools.

4.1.3.2 Collaboration in Spain/ Basque country

The University of Deusto entered a cooperation with the Center of Education Development and Innovation (BERRITZEGUNEAK). Representing the Directorate of Educational Innovation Department of Education, Linguistic Policy and Culture of Basque country, the Berritzeguneak provides support and development to regional education. The Berritzeguneak consists of consultants and advisors from different non-university education levels, such as nursery, primary, secondary school, and adult education. The center was created in order to:

- Energize school districts in Basque country with new pedagogy;
- Innovate and improve educational school instruction;
- Work on continuous professional development of school teachers;
- Promote educational response to students with disabilities and special educational needs.

The Spanish Go-Lab team started the cooperation with Berritzeguneak from several visual and practice reflection workshops. In one year, the collaboration intensity increased by offering a 20-hours course on the development of a five-step inquiry-based learning scenario using Go-Lab facilities – inquiry learning apps, remote and virtual labs, and Inquiry Learning Spaces. The “Go-Lab course” is presented in the Berritzeguneak course catalog of recommended training for the school year of 2016-2017. This training is set up by University of Deusto, under umbrella of the Berritzeguneak center. Certificates of course completion are issued by the Directorate of Educational Innovation Department of Education, Linguistic Policy and Culture of Basque and granted to the secondary school teachers. In 2015-2016, 12 teachers received such certificates as well as certificates of the Go-Lab project.

4.1.3.3 Collaboration in Portugal

NUCLIO continued their work started in the previous years with the Ministry of Education, more specifically with the department of Education Resources and Technologies. The MoE endorses Go-Lab activities conducted in Portugal and recognizes the quality of the project and the work implemented so far. NUCLIO has also managed to formally accredit a 25-hour course for school teachers devoted to Go-Lab. Over 100 teachers have already received certificates and credits from this course, contributing to their career development.

4.1.3.4 Collaboration in Germany

IMC presented Go-Lab to the Smart School initiative, which aims to digitalize two pilot schools in Saarland. These schools become ecosystems to prepare students for life in the digital society. The schools will be equipped with modern hardware and learning software, the teachers will be trained in using new equipment and software programs. As a part of this initiative, IMC will provide access to the Go-Lab Portal, its learning applications, and supportive materials, as well as to the Go-Lab MOOC. Moreover, IMC will conduct trainings for teachers, introducing them to the inquiry-based learning approach and training them in the use of the Go-Lab Portal. The digitalization of the schools will take place beginning with November 2016. The Smart Schools will be visited by the Minister of Education and Prime Minister of Saarland.

Furthermore, IMC established contact to the representatives of German private foundations active in school education: Bertelsmann Stiftung, Stiftung Mercator, Robert Bosch Stiftung, Siemens Stiftung, and German Ministry of Education. The project was presented at the Forum "Bildung und Digitalisierung" (“Education and Digitalization”, in scope of "IT-Gipfel"). However, no cooperation agreements have been reached so far.

In September 2016, IMC presented Go-Lab to the representatives of the following ministries: Halmstad Municipality, Sweden, Ministry of Finances of Saxony-Anhalt, Germany, Konneveden Municipality, Finnland, and Viladecans City Council (Municipality representing Catalanian region), Spain. This has been done in scope of the presentation of the SiWay prototype, which is a platform for STEM-education in schools, based on the Learning Management System of IMC and the Go-Lab Portal. These ministries are interested in purchasing such learning environment and implementing it at the national level. The next (virtual) presentation will take place in the second week of November 2016. (See Section 4.2.3 for details about SiWay).

Finally, Go-Lab will be presented with an interactive booth at the conference “Digitale Bildung für alle!” (“Digital Education for All!”) in scope of the IT-Gipfel-Day. The booth will be visited by representatives of schools, policy makers, and particularly by the Minister of Education and Prime Minister of Saarland.

4.1.4 Interim summary

Based on the above, we can conclude that the following actions are needed, in order to make Go-Lab sustainable in a long term and to provide a commercial solution:

1. From end-users’ (teachers’) point of view: a more diversified portfolio of tools has to be provided, in terms of covered subject domains and age ranges (e.g. covering also primary school students). Furthermore, the offer should be wrapped in “packages” covering curriculum of particular countries, where the system is offered. A possibility to work with those “packages” offline should be provided.
2. From school decision-makers’ (headmasters’) point of view: guidelines for the use of educational software in schools have to be provided by the Ministries of Education. Additional budget has to be provided to schools accordingly, or the software has to be delivered centralized to all schools by the Ministries of Education.
3. From the customers’ (ministries’) point of view: the ministries recognize the need for modernization of school education, especially in STEM subjects. However, before the ministries will be able to decide which software system to implement, they need to take a decision on digitalization of education and allocation of resources for this process (purchase of hardware and software, teacher training, etc.). (See Section 4.3.3.3 for the developments in this area).

In the Section 4.2, we present the actions taken by the Go-Lab consortium regarding the challenges mentioned above. After it, in the Section 4.3, we present the exploitation plan for Go-Lab and related projects.

4.2 Sustainability after the project time

This section presents actions taken and planning for the sustainability of the Go-Lab Portal and Go-Lab teacher community, the development of a commercial product based on Go-Lab, collaboration with commercial providers of STEM-resources, as well as activities related to standardization of the technology.

4.2.1 Further development of the product

In the Deliverable D9.4 (M36), we identified the following exploitable results:

1. Go-Lab Portal, including Golabz Repository, Authoring Platform Graasp, and Go-Lab Tutoring Platform.
2. Online laboratories and inquiry learning applications.
3. Learning analytics engine allowing to receive and analyze data regarding the use of the tools and learning progress of each student.

All of these software components will be maintained and further developed after the Go-Lab project end, and will be available for teachers free of charge.

At the beginning of 2016, ten Go-Lab partners together with two new partners from Finland and France applied for a project based on Go-Lab - Next-Lab (Next Generation Stakeholders and Next Level Ecosystem for ColLaborative Science Education with Online Labs). The project proposal has been accepted and the Next-Lab project is starting in January 2017 and will last three years till the end of 2019.

The Next-Lab project will take Go-Lab to a next impact and innovation level, by extending the context of use and by including a number of new features and facilities that are required by students and teachers, for example:

- A set of apps to support students in active acquisition of 21st century collaboration and reflection skills, apps for self- and peer- assessment, apps for creation of runnable scientific models, and others.
- A solution to support ePortfolio creation and management by students.
- Collaborative spaces exploited as personal learning environments for advanced students, ready to manage teamwork, as well as resources creation and integration by themselves.
- A set of exemplary co-created learning spaces that can be directly used by teachers or can function as an inspiration for the creation of own learning spaces (compare to resource “packages”, Sections 4.1.2.1 and 4.1.4)
- Personalized and contextualized control for teachers and students over privacy settings and storage of learning traces (xAPI).

Next-Lab Portal will provide a set of at least 500 online labs (making it the largest in its kind in the world), an extensive set of inquiry support and 21st century apps for different levels of education, and 1,000 learning spaces[55].

Thus, Go-Lab software will be further developed during the next three years, remaining up-to-date and correspondent to the market needs. After Next-Lab end, the system will be kept

[55] Source: Next-Lab Project Proposal

online and maintained for at least two years, independently of the funding availability or exploitation success. A commercial version of the product to assure long-term sustainability is being developed (see Section 4.2.3 for details).

4.2.2 Further development of the community

During its four years duration, Go-Lab has reached more than 1,600 teachers, who have been involved in the teacher training activities provided by Go-Lab and who keep in touch with the project in scope of implementation activities, as well as via the project newsletter (WP6) and social media. These teachers will be invited to continue collaboration with the project in scope of Next-Lab. Next-Lab will be positioned as a continuation or "upgrade" of Go-Lab, so the community stays with us in scope of this new initiative.

National and international training courses on inquiry learning, 21st century skills, and online laboratories will be offered to pre-service and in-service teachers by the Next-Lab project. Joint Summer Schools uniting teachers participating in various European projects will be organized. They will be partly funded through Erasmus+ in the same way it has been done in Go-Lab (in 2016, 10 of 40 applications for the Go-Lab Summer School (25%) were accepted, so the funding of about 4,000€ was received).

Furthermore, international webinars will be conducted to support teachers in the use of the system. Free online teacher and school support will be available. Go-Lab MOOC will be ongoing available until it is replaced with the new Next-Lab MOOC presenting the updated system. Finally, a recognition scheme for teachers will be implemented, based on the digital badges elicited from learning analytics of the Portal (in terms of adoption of the inquiry approach and engaging colleagues in collaborative design).

International Next-Lab expertise centers (replacing Go-Lab National Coordinators) will be available for teachers to provide training, support, and answer questions. Moreover, Next-Lab Ambassadors (experienced teachers and teacher trainers) will promote Next-Lab in different countries and provide training to pre-service and in-service teachers. Teacher Training Institutions as well as European and National Teacher Organizations will be addressed and assisted in designing teacher training courses and creating training materials.

Furthermore, Next-Lab will extend the context of the implementation of the results by:

1. Addressing primary education, in order to assure a smooth transition and situate students' enrolment in science and technology profiles at an early age (compare to Section 4.1.4, point 1, teachers' requirements).
2. Introducing Next-Lab in pre-service secondary teacher training programs throughout Europe to specifically address the next generation of teachers and achieve a long-term impact. Next-Lab courses will be integrated in the curriculum of a minimum of 12 secondary teacher training programs[56].

Next-Lab will continue the work of Go-Lab in a very large scale pilot reaching thousands of teachers and students from all over Europe and assuring that Go-Lab/ Next-Lab will become mainstream system to be used in schools.

[56] Source: Next-Lab Project Proposal

4.2.3 Development of a commercial product

A commercial product is being developed in scope of the project SiWay (STEM it your way!) funded by IMAILE project (http://www.imaile.eu, funded by the European Commission, FP7). IMAILE 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 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.

The PCP call for tenders launched by IMAILE consists of three phases: (1) Solution Design Exploration with a duration of three months and a maximum number of eight contractors; (2) Prototype Development with a duration of six months and a maximum number of four contractors; and (3) Proof of Concept with a duration of seven months and a maximum number of two contractors. To the moment of writing of this Deliverable, SiWay consortium (including IMC, EPFL, UT, and EA) is in the Phase 2 (Prototype Development) which will last till the end of November 2016. After that, if the consortium is selected for participation in Phase 3, the prototype will be tested in schools in Finland, Germany, Spain, and Sweden starting in January 2017.

The SiWay project aims at supporting STEM teaching and learning in European schools by providing an innovative learning environment (the SiWay Portal) combining curriculum-based and self-regulated learning approaches, thus, making the learning process centered around the needs of each individual student. The SiWay Portal is a personal and collaborative learning environment supporting teachers (T) in preparing customized learning scenarios and mentoring and assisting students during the learning process, students (S) in defining their learning goals and interests and designing own, personalized learning paths, and parents (P) in supporting their children and monitoring their progress (see Figure 37)[57].

Figure 37. SiWay Portal Architecture.

[57] Source: SiWay publishable summary

The SiWay system is developed based on the commercial Learning Management System of IMC (IMC Learning Suite), Golabz Repository, Graasp Authoring Platform, and Go-Lab Tutoring Platform. These systems are integrated on the functional and data level, providing a common user interface and a single-sign-on for all sub-systems of SiWay system. Furthermore, the existing functionalities of the sub-systems are extended to cover the requirements defined by IMAILE. The main innovations offered by the SiWay system (compared to its basis systems) are:

- Learning activity tracking in all sub-systems, advanced learning analytics, and learning progress visualisation for teachers, students, and parents
- Access to additional, external STEM Open Educational Resources (OER) beyond Golabz Repository (for example, serious games, learning videos, worksheets, etc.)
- Automated recommendation of additional learning resources based on student's interests, courses he/she is involved in, progress in the courses, and resource popularity among other students
- Gamification features (customizable badges and leader boards)

Thus, the LMS-component of the SiWay system will mostly cover curriculum-based learning, offering functionalities for content management (such as creation of obligatory learning courses) and user management (incl. monitoring of the students' progress), Go-Lab-components will cover inquiry-based learning and user collaboration, whereas the new components of the system will allow personalisation of the learning process, in terms of setting individual learning goals and recommendation of recourses to support achievement of these goals and closing knowledge gaps. The SiWay Portal is planned to be offered as a commercial product to the Ministries of Education in different European countries (see Section 4.3.3 for details).

4.2.4 Collaboration with commercial providers

In addition, Go-Lab is investigating a number of possibilities of cooperation with commercial providers of STEM tools and content.

PhET online labs

A big number of free online labs provided by PhET is already included in Golabz Repository. A possibility is being discussed with PhET to commercialize advanced learning analytics features available through data exchange of PhET labs with Inquiry Learning Spaces (ILSs). This can be done by offering some PhET online labs under their iO license[58], e.g., to organizational customers such as Ministries of Education or educational providers (not individual customers, for which Go-Lab has to remain free of charge).

Labster

Labster (https://www.labster.com) is a private company based in Denmark dedicated to developing fully interactive advanced lab simulations based on mathematical algorithms that support open-ended investigations. These are combined with gamification elements such as an immersive 3D universe, storytelling, and a scoring system. Labster expressed their interest in offering their virtual reality labs via Go-Lab or in scope of another related project. This will be followed-up in Next-Lab and SiWay Phase 3 (if approved).

[58] PhET iO-lisense: https://phet.colorado.edu/en/licensing

Smartcircuits Innovation
Smartcircuits Innovation (http://www.smartckts.com) is a private company based in India offering physical sets of tools for STEM education and experimenting (Science Trek sets). Smartcircuits Innovation expressed their interest in (1) the development of ILSs on demand, each suitable for a particular Science Trek activity; (2) the development of virtual labs and simulations for particular Smart Trek activities; and (3) publishing Science Trek ILSs in a special area of the Go-Lab Portal. Possible cooperation modalities are currently being discussed.

Pearson Higher Education
In the mid of October, we have received a contact request (through the Go-Lab project website contact form) from a representative of Pearson Higher Education (https://www.pearsonhighered.com) wanting to discuss cooperation possibilities. This will be further investigated.

4.3 Technology standardization

The main objective of the standardization task is to contribute in the maximum extent possible to the development of industrial standards to embed online laboratories in LMS architectures for educational use. In this respect, the main effort of Go-Lab researchers has been the proactive participation in standardization forums. The main progress has been achieved in the scope of the IEEE Standards Association P1876 group in which several Go-Lab researchers are involved.

Apart of the online interactions, during the last semester of 2015 Miguel Rodriguez Artacho (UNED) was in Montreal working with Hamadou Saliah-Hassane (TELUQ University) who is the chair of P1876. During this period, a substantial step forward was done in relation with the standard draft. Additionally, Denis Gillet (EPFL) joined during a week, previously to the presentation of the draft. He helped to outline and define aspects related to the different layers involved in the definition of the laboratories, using in some aspects the smart device approach from EPFL. This means that the IEEE group has had a substantial input from Go-Lab, which is under evaluation at the moment. Finally, the draft was presented in El Paso, Texas in the scope of the IEEE 2015 FIE Conference. It has been an important achievement because it is also the first standardization activity hosted in the education chapter of the IEEE.

Participation of Go-Lab researchers has consisted in the edition of the first draft, the organization of the review process using IEEE-SA procedures, and the presentation of the draft in the mentioned conference.

During the first semester of 2016, the main activities on standardization after the first draft were based on the definition of the vocabularies to describe learning activity carried out in the laboratories using xAPI statements. Presentations of the progress in these aspects were made in the REV conference in February 2016 (http://www.rev-conference.org/REV2016) and eMadrid seminars (www.emadridnet.org) in April 2016. Furthermore, a workshop was held in scope of the LACCEI 2016 conference (http://laccei.org/conference2016) introducing the planned standard to 26 representatives

of 12 industries and associations, in order to collect their input and disseminate the upcoming delivery of the new standard.
This work is still in progress and no further drafts have been released yet. However, progress of the draft is expected to be presented in the next FIE Conference in October 2016.

4.4 Exploitation planning

This section presents current exploitation plans in conjunction with activities in the follow-up project Next-Lab and the commercial spin-off project SiWay.

4.4.1 X-Lab Association

Go-Lab consortium members responsible for the development and delivery of the Go-Lab Portal and related services (UT, EPFL, and IMC) are working on the establishment of the X-Lab Association, which will be a legal body responsible for the sustainability and exploitation of Go-Lab/ Next-Lab results.
The aims of this association are to:

1. Conduct partner and customer relationship management activities;
2. Secure donations, sponsorships, and funding to sustain and develop the association;
3. Manage distribution of funding and revenues among participating stakeholders to achieve goals 1-4 bellow.

The association members will contribute intellectual and personnel resources to the association. Between January 1st, 2017 and December 31st, 2019 the association will build a financial basis to continue the following activities after this period:

1. Exploit the Go-Lab/ Next-Lab authoring platform (empowered by Graasp)
2. Exploit the Go-Lab/ Next-Lab Portal (repository), including online labs and inquiry learning applications;
3. Populate the Go-Lab/ Next-Lab Portal with new online labs created by the association members and external providers;
4. Conduct teacher training and user support activities.

Revenues are foreseen to come from software licensing, external sources such as Ministries of Education, extra Go-Lab services (e.g., extra learning analytics) and training courses. In more detail the plans are:

1. Teachers and students will have open access to the ecosystem, being able to use most of its functions for free. This supports sustainability in terms of platform traffic and generation of new open educational materials for mix and re-use.
2. Expertise centers will offer teacher trainings, consulting services, quality assurance, implementation support, and other services on a paid basis. Such presence and online training offers, as well as other services, will be further developed during the Next-Lab project time and exploited commercially after the end of the project.
3. Together with commercial partners, such as external technology and content providers or commercial lab owners, we create commercial offers providing added value to the existing product and services (for example, advanced learning analytics, virtual reality labs, combination of virtual learning environments and physical experimental sets, etc.).

4. The project results will be integrated into the curricula of teacher training programs and into the curricula of science education itself in different European countries, thus, offering added value to public educational institutions. Next-Lab will negotiate with public educational institutions and Ministries of Education to receive base funding to offer its ecosystem and support services or to adapt and implement them to new regions.
5. Further possibilities to generate additional revenue streams (such as sponsoring, advertising, commissions, membership fees to an association) will be investigated.

During the course of the Next-Lab project acquired funds are used to handle external stakeholders (online lab providers, teacher trainers, sales partners, etc.) on a contract basis and will form a basis for the activities after this project.

Three partners (UT, EPFL, and IMC) will enter the new X-Lab Association, other consortium members will contribute to the promotion, implementation, and support based on Next-Lab funding during the course of the project and on a contract basis after this. Alternatively, other partners may join the association after the Next-Lab project. The X-Lab association is planned to start functioning on January 1, 2017.

Currently, the conditions for the establishment of the association are being reviewed by the legal departments of the involved partners.

4.4.2 IMC MINT Cloud

A commercial product to be offered to the Ministries of Education and implemented in a centralised way in different countries and regions is being developed in scope of the SiWay project (see Section 4.2.3).

There is a growing interest and funding from European national governments to increase technology enhanced learning in schools. This can be seen by the IMAILE call involving Ministries from Sweden, Finland, Germany, and Spain. Moreover, in Germany a strategy “Educational campaign for the digital knowledge society” (“Bildungsoffensive für die digitale Wissensgesellschaft”) has been announced by the German federal ministry for education, according to which 5 billion Euro will be spent for the digitalisation of school education in the next five years. Also, the international market is growing, as demonstrated by recent multi-million nationwide digital learning initiatives in Singapore, where IMC is executing a large contract.

In order to address these developments on the market, IMC is going to introduce a new product “IMC MINT Cloud”, which will be announced in November 2016, first addressing the German market. IMC MINT Cloud is based on the prototype developed in the SiWay project and addresses the increasing need for digital learning environments in schools, targeting especially STEM teaching and learning. The product allows schools to provide a richer learning experience to their students leading to a deeper STEM knowledge and to provide positive experiences that lead to positive attitudes towards STEM. It supports the current curriculum-based and teacher-led education in schools, but also the more student-centred inquiry-based learning approach. Furthermore, it adds an automatic recommendation of additional learning resources tailored to the interests and educational needs of each individual student.

Main end users of the product are teachers, school students, and parents. As there is currently no plan to sell the product to them directly, but rather to the regional authorities, they are only considered as end users, not customers. On the other hand, teachers and school principals are seen as influencers on the customer. Only if they are content with the product will they support its procurement, continued use and purchase of subsequent product versions. To support this, teachers will be offered to use the Go-Lab/ Next-Lab part of the product for free with their students. It is expected that Go-Lab, SiWay and Next-Lab will create an awareness of good modern STEM education and desire for more broad use of it in the school system.

IMC will address the customer segment of regional authorities, procuring ICT solutions for schools in their region. The market type is large business-to-business market with procurement via public call for tenders. IMC has extensive experience in marketing and sales to private and public organizations in Europe and beyond. It will use its expertise to provide tenders, make sales presentation at the client's site and win a contract.

IMC will fund all activities related to the customer acquisition and further system development. In order to limit risks related to the development of an innovative product for a new market, IMC will first find a customer interested in buying the product. After that, a market-ready product will be developed out of the SiWay prototype (we calculate with 6 months duration and 12 person-months effort within this time period).

The product to be offered to the customers consists of two main components: IMC Learning Suite and the Go-Lab Portal (including Graasp Authoring Platform, as well as quality-controlled repository of online labs, apps and inquiry learning spaces). The partners EPFL and UT will support the development of this product under a contract with IMC. As soon as X-Lab Association is established, this will be managed through this Association. IMC will act towards the customer as the single contractor and provider. Customers will not need to worry about where different parts of the system come from: IMC will handle this via subcontracts, sharing a fixed percentage of the purchaser (regional authority) contract turnover with the X-Lab Association.

5. Summary and Outlook

During its four-year duration, Go-Lab promoted its activities and results to various groups of stakeholders, including teachers, headmasters, representatives of Ministries of Education, researchers in STEM education and TEL areas, as well as potential technology and dissemination partners. Go-Lab conducted about more than 550 presence events, including presentations at national and international conferences, workshops, and demo-sessions; 125 of these events were organised in cooperation with related projects and initiatives. All together, these events attracted more than 25,000 participants. About 10% of them joined Go-Lab online community, which currently counts more than 2,500 users. Furthermore, Go-Lab published 90 scientific publications. Some papers received best paper awards of international conferences and many papers are referenced by researchers as a part of state of the art in STEM education.

As a result of joint efforts of WP6, WP7, and WP9, more than 1,600 teachers became a part of Go-Lab attending its training activities and implementing Go-Lab in the classroom. Go-Lab created a set of products and services, which will be offered to the teachers also after the project time. These include the Go-Lab Portal, including a repository for online labs and inquiry learning apps, an authoring environment, and a tutoring platform as well as Go-Lab Academy, organising national and international training events for teachers and providing online support. Finally, Go-Lab created a set of supportive materials for teachers, including Go-Lab online course, multiple demo-videos, text guidelines, tips & tricks, and so on. Go-Lab consortium will keep offering these products and services to the teachers free of charge, financing its activities through follow-up projects and teacher training and mobility programmes, such as Erasmus+.

The project team assured sustainability of the project results and their further development and implementation by applying for a follow-up project Next-Lab, which has received funding in scope of Horizon2020 programme. In this project, the Go-Lab Portal will be extended with new features, such as tools for acquisition of 21st century skills. The project will extend its context focusing also on teacher training institutions and pre-service teachers, as well as providing tools for primary school education. The exploitation models will be further investigated and validated, with the aim to implement a commercial model assuring long-term sustainability of the project results. The first steps towards implementation of such model have already been done in Go-Lab.

A first commercial product based on Go-Lab technology is being developed in scope of the SiWay project, aiming to offer the SiWay system to the Ministries of Education in different European countries and implement it in the majority of European schools. IMC takes the lead in the exploitation of this commercial product and bringing it to the market, acting together with Go-Lab/ Next-Lab Association, involving UT and EPFL. Collaboration with the Ministries of Education in Germany, Finland, Spain, and Sweden, interested in purchasing such product, is already taking place. The revenues acquired from SiWay commercialisation will be used to maintain and further develop the Go-Lab Portal and to provide complimentary services to teachers.

Annex A: Overview of dissemination activities (Year 4)

Activity	Date(s)	Country	Nr. of participants	Link (if available)
PRESENTATIONS, KEY NOTES, INVITED TALKS				
Presentation at OeAD Vienna	24.02.2016	Austria	15	
Go-Lab speed-dates	17.03.2016	Austria	30	
Go-Lab demo at Earli SIG 20 & SIG 26 meeting	23.08.2016	Belgium	30	http://www.earli2016.ugent.be
Presentation of the paper "Evaluation of a hypothesis formulation tool and an experiment design tool in a Computer-Supported Inquiry Learning Environment" at the EARLI SIG20	22.08.2016	Belgium	20	
Workshop for teachers and students	01.08.2016	Brasil	40	
Presentation of a use case with VISIR online lab	05.09.2016	Brasil	10	
Project presentation at QED 2016 - UNESCO	13.06.2016	Bulgaria	32	
Keynote at UQAM Institute for Cognitive Science Summer school	30.06.2016	Canada	150	http://www.summer16.isc.uqam.ca/page/renseignement.php?lang_id=2
Presentation in scope of the International workshop on e-Learning in Shanghai	27.04.2016	China	40	
Go-Lab presentation at "Communicating Astronomy with the Public 2016"	19.11.2015	Colombia	20	
Presentation entitled "Implementation of a computer supported learning environment which embed virtual experimentation" during the conference «Integration of ICT in Learning Process»	21.05.2016	Cyprus	100	
Special invited session at the 12th Joint European Summer School on Technology Enhanced Learning: Reflection on 15 years of TEL (Learning analytics)	24.06.2016	Estonia	40	
Presentation of the Go-Lab paper at Earli SIG 10, 21 & 25 meeting	28.08.2016	Estonia	30	http://earlisigtartu.ut.ee/avaleht
Presentation of Go-Lab to the University Agency of the French-speaking countries	09.11.2015	France	15	
ICCE Presentation of the Paper: Exploring Deviation in Inquiry Learning: Degrees of Freedom or Root of all Problems?	04.12.2015	Germany	30	
Presentation on Inquiry Learning and Go-Lab at the Hochschule Ruhr West, Bottrop, Germany	06.07.2016	Germany	20	
DeLFI Presentation of the Paper: Concept Cloud: Supporting Reflection in the Online Learning Environment Go-Lab	12.09.2016	Germany	40	
DeLFI Presentation of the Paper: Fake or Real? Analyse physikalischer Phänomene in viralen Videos im forschend-entdeckenden Lernkontext	12.09.2016	Germany	40	
ICALT Presentation of the Paper: “Concept Cloud”: Supporting Collaborative Knowledge Construction based on Semantic Extraction from Learner-generated Artefacts	26.07.2016	Germany	40	
Go-Lab promotion at two committees of BITKOM for the digitisation of German school education	05.07.16	Germany	10	
Presentation of Go-Lab for the Smart School initiative; offering to include Go-Lab starting in a pilot school in Saarland	20.05.16	Germany	26	
Presentation of Go-Lab in the program committee of the Educational Congress "Bildung für Alle". Accepted to be presented at a booth and presentation (at 16th Nov 2016).	04.05.16	Germany	4	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Go-Lab presentation at IMCL conference 2015	20.11.2015	Greece	30	http://www.imcl-conference.org/imcl2015
Science Fair for the general public in the morning, outreach lecture in the evening	08.07.2016	Greece	80	
Science Fair for the general public in the morning, outreach lecture in the evening	27.08.2016	Greece	100	
Science Fair for the general public and outreach lecture	28.08.2016	Greece	40	
Poster presentation during the Pan-Hellenic and International Conference on ICT in Education entitled "The impact of a hypothesis formulation tool and an experiment design tool on primary students' inquiry skills when using a Computer-Supported Inquiry Learning Environment".	23.09.2016	Greece	15	
Presentation of Go-Lab ILSs to high school teachers of Crete. Distribution of relevant material.	09.03.2016	Greece	15	
Presentation of Go-Lab ILSs to high school teachers of Crete. Distribution of relevant material.	19.03.2016	Greece	19	
Presentation of Go-Lab ILSs to high school teachers of Zakynthos. Distribution of material.	19.04.2016	Greece	15	
Go-Lab presentation at ICTIEE conference 2016	10.01.2016	India	50	http://ictiee.org/ictiee2016
Presentation Go-Lab and Graasp at Kumamoto University by Denis Gillet	11.03.2016	Japan	30	
Keynote and Workshop at TALLER INTERNACIONAL NUEVAS TENDENCIAS EN LA ENSENANZA DE LA FÍSICA	26.05.2016	Mexico	75	http://www.fcfm.buap.mx/taller/index.php
Presentation of a study regarding the EDT at ICO national fall school in Utrecht, the Netherlands	05.11.2015	Netherlands	50	
Platform Bèta Techniek (the Dutch STEM platform): STEM conference 'Together for the future of STEM talent'	10.01.2016	Netherlands	150	www.platformbetatechniek.nl/conferentie
CDIO European Regional Meeting 2016	25.01.2016	Netherlands	50	http://www.cdio.org/node/6216
Presentation of the EDT at an ICO course (domain-specific instruction) in Utrecht, the Netherlands	23.03.2016	Netherlands	15	
Go-Lab presentation for school leaders (Stichting Carmel)	14.04.2016	Netherlands	9	https://carmel.nl/nieuws/agenda/schoolleidingendag-66736#.V20ez2iLTIU
Keynote at Kennisnet/NRO onderzoeksdagen	16.06.2016	Netherlands	1.500	https://www.kennisnet.nl/bijeenkomsten/agenda/onderzoeksconferentie-2016/
Go-Lab presentation PLC-group De Thij Oldenzaal	20.06.2016	Netherlands	9	
Keynote at NATED PhD Days	11.11.2015	Norway	100	http://www.uv.uio.no/english/research/doctoral-degree/schools/nated/phd-days/2015/
Keynote at the Symposium on Advances in Digital Technology for University Teaching and Learning	30.11.2015	Norway	150	http://adila.prosjekt.uia.no/?page_id=342
Online workshop with Brazilian teachers	14.03.2016	Online	6	
Presentation for international partners	23.03.2016	Online	15	
Go-Lab presentation at "Science through the hands of scientists" event	07.09.2015	Portugal	55	
Go-Lab presentation at the International Conference on Communication and Light	02.11.2015	Portugal	200	
Go-Lab presentation at "Salesianos de Manique" event	11.11.2015	Portugal	120	
Presentation during a workshop for teachers (Teacher training in the framework of Light Pollution training for secondary schools in Portugal)	21.11.2015	Portugal	15	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Presentation during a workshop for teachers (Teacher training in the framework of Light Pollution training for primary schools in Portugal)	24.11.2015	Portugal	50	
Go-Lab presentation in scope of NUCLIO on the Road	16.01.2016	Portugal	15	
Presentation at 2º Encontro de Ensino e Divulgação das Ciências	08.07.2016	Portugal	100	
Presentation at XXVI ENAA - Aveiro	08.09.2016	Portugal	40	
Presentation at Noite Europeia dos Investigadores	30.09.2016	Portugal	200	
Go-Lab presentation at the National Conference for Science Education	12.09.2015	Portugal	50	
Go-Lab presentation at Oliveira do Bairro Science Fair	25.09.2015	Portugal	90	
Go-Lab presentation at the "Inquiry in Classroom" event	24.10.2015	Portugal	15	
Presentation at the IBL conference in Setubal, Portugal	24.10.2015	Portugal	100	
Go-Lab dissemination in teachers workshop	12.12.2015	Portugal	15	
Presentation of Go-Lab during a school visit (implementation in the morning for students and pilot teachers, and dissemination for the school community in the afternoon) - Escola Secundária de Palmela	15.12.2015	Portugal	10	
Presentation of Go-Lab during a teachers event - Instituto de Educação e Cidadania	16.01.2016	Portugal	20	
Presentation of Go-Lab during a school visit (implementation in the morning for students and pilot teachers, and dissemination for the school community in the afternoon) - Escola Sec. Luís de Freitas Branco	25.01.2016	Portugal	5	
Presentation of Go-Lab during a school visit (implementation in the morning for students and pilot teachers, and dissemination for the school community in the afternoon) - Escola Poeta Bernardo Passos	27.01.2016	Portugal	10	
Presentation of Go-Lab during a school visit (implementation in the morning for students and pilot teachers, and dissemination for the school community in the afternoon) - Escola Secundária de Penafiel	27.01.2016	Portugal	20	
Presentation of Go-Lab during a school visit (implementation in the morning for students and pilot teachers, and dissemination for the school community in the afternoon) - Escola Basica de Lanhas	19.02.2016	Portugal	5	
Presentation of Go-Lab during a teachers event - Teatro de Braga	19.02.2016	Portugal	20	
Presentation during a workshop for teachers - Escola Secundária Seomara Costa Pinto	27.02.2016	Portugal	16	
Go-Lab presentation at "Minds-on Hands-on in Experimental Sciences"	12.03.2016	Portugal	40	
Go-Lab presentation to members of the recently created Portuguese Language Expertise Center (an initiative of the International Astronomical Union) - Participants were from: Cape Verde, Brazil, São Tome and Principe and Mozambique	04.05.2016	Portugal	15	
Presentation during a workshop for teachers - Escola Básica Horácio Bento	24.08.2016	Portugal	12	
Project presentation during a teacher's workshop	30.05.2016	Serbia	18	
Project presentation during a teacher's workshop	01.06.2016	Serbia	32	
Project presentation during a teacher's workshop	04.06.2016	Serbia	16	
European Conference on Research in Chemistry Education.	07.09.2016	Spain	250	http://ecrice2016.com/
Presentation of Go-Lab at the EMINENT conference in Barcelona	20.11.2015	Spain	200	http://www.eun.org/about/eminent

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Go-Lab presentation in scope of a Teacher Training, Tenerife	27.07.2016	Spain	20	
Poster session during the EDULEARN conference entitled "The effect of two different configurations of a software tool for constructing graphs on secondary school students' knowledge and inquiry skills"	04.07.2016	Spain	50	
Poster session during the EDULEARN conference entitled "Examining the added value of the use of an Experiment Design Tool among secondary school students when experimenting with a virtual lab"	04.07.2016	Spain	50	
Presentation of the paper "An advanced Go-Lab scenario for the GUI-based analysis of large samples of particle physics data " at the REV 2016 conference in Madrid	22.02.2016	Spain	100	http://www.rev-conference.org/REV2016
eMadrid Open Project presentations: Online laboratories and standards	26.02.2016	Spain	22	http://www.rev-conference.org/REV2016
Presentation of the Go-Lab paper at INTED conference 2016	07.03.2016	Spain	30	
Presentation of the Go-Lab paper at Edulearn conference 2016	05.07.2016	Spain	50	
Presentation of Go-Lab to the Swiss Physics Teacher Society by Denis Gillet	02.12.2015	Switzerland	10	
Workshop for the French-speaking Swiss physics teachers	22.09.16	Switzerland	50	
Presentation of the Science Fair held at Chania at the IPPOG 2015 in Geneva	04.11.2015	Switzerland	35	https://indico.cern.ch/event/440711
Go-Lab presentation at Gaia Teacher Training, RAL	13.06.2016	UK	10	
Go-Lab presentation at National Astronomy Meeting, Nottingham	28.06.2016	UK	50	
Student presentation (WP9; not reported to WP7)	22.06.2016	UK	27	
Teacher presentation (WP9; not reported to WP7)	28.06.2016	UK	1	
School presentation (WP9; not reported to WP7)	12.07.2016	UK	33	
Talk about Go-Lab at Bridgend Astronomical Society meeting	11.03.2016	UK	20	
Presentation of the paper "Towards a Teaching Analytics Tool for supporting reflective educational (re)design in Inquiry-based STEM Education"	25.07.2016	USA	250	http://www.ask4research.info/icalt/2016/accepted_papers
Remote labs workshop - Conference of the American Society of Engineering Education	26.06.2016	USA	20	
Presentation at IMCL conference 2016	17.10.2016	USA	20	http://www.imcl-conference.org/imcl2016/documents/program.pdf
Conference presentation at AERA conference	08.04.2016	USA	50	http://www.aera.net
WORKSHOPS, DEMONSTRATIONS, HANDS-ON SESSIONS				
Flemish MoE Meeting	14.01.2016	Belgium	3	
Slovak MoE meeting	28.01.2016	Belgium	2	
Ministries of Education - STEM representatives Working group	17.03.2016	Belgium	16	
Go-Lab Workshop @ Innovative Practices for Engaging STEM teaching	18.09.16	Belgium	16	
Workshop at the 14th International Conference on Web Learning: Go-Lab Hands-on Workshop on Inquiry Learning with Online Labs	05.11.2015	China	30	http://go-lab-project.eu/workshop/go-lab-hands-workshop-inquiry-learning-online-labs

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Demonstration of Go-Lab activities in the 1st Mediterranean Science Festival	04.12.2015	Cyprus	20	http://www.mediterraneansciencefestival.com/
Organisation of a Go-Lab workshop for the science teachers	17.11.2015	Estonia	22	
Go-Lab workshop in scope of Industrial Session at JTEL Summer School 2016	24.06.2016	Estonia	25	http://www.prolearn-academy.org/Events/summer-school-2016/
Workshop at the 12th Joint European Summer School on Technology Enhanced Learning: Ethics & Privacy in Learning Analytics	20.06.2016	Estonia	18	
Workshop at the 12th Joint European Summer School on Technology Enhanced Learning: Lightweight Development and Deployment of Standardized Remote Labs	24.06.2016	Estonia	25	
Workshop at the European Conference on Technology Enhanced Learning: Connecting Learning Design and Learning Analytics (CLAD)	16.09.19	France	7	http://clad2016.ld-grid.org/
Go-Lab demo at DeLFI conference on e-learning and informatics. Introduction to the Workshop „Forschendes Lernen und E-Learning“	11.09.16	Germany	20	http://ceur-ws.org/Vol-1669/Preface.pdf
Twents Meesterschap	27.01.2016	Netherlands	25	https://www.utwente.nl/lerarenconferentie/
ECENT conferentie	18.05.2016	Netherlands	12	http://www.fi.uu.nl/ecentelwier/
Woudschoten conferentie	11.06.2016	Netherlands	24	http://www.fi.uu.nl/woudschotenchemie/conferentie/beschrijving.php?id=999
Go-Lab speed-dates at Canisius Almelo	21.06.2016	Netherlands	25	
Melanchthon Schiebroek	03.09.2016	Netherlands	25	
Online workshop with Brazilian teachers	24.11.2015	Online	7	
Demo session with teachers and students	15.01.2016	Portugal	27	
Workshop with teachers: Construção de um cenário educativo	16.01.2016	Portugal	18	
Big Ideas of Science workshop in Barcelona	09.12.2015	Spain	10	
Workshop with teachers: Using Go-Lab for Inquiry Based Learning	02.03.2016	Spain	20	
Workshop with teachers: Using Go-Lab for Inquiry Based Learning	25.05.2016	Spain	8	
Workshop at the Learning Analytics Summer Institute: CLEO - Contextual Learning analytics Enforcing data Ownership	28.06.2016	Spain	13	-
Teacher training event, National Space Centre, Leicester	21.04.2016	UK	8	
Work with teacher writing a large ILS (WP9; not reported to WP7)	15.02.2016	UK	1	
Attend / support classroom delivery session (WP9; not reported to WP7)	29.02.2016	UK	18	
Attend / support classroom delivery session (WP9; not reported to WP7)	10.03.2016	UK	17	
Attend / support classroom delivery session (WP9; not reported to WP7)	14.03.2016	UK	18	
Teacher interview / support (WP9; not reported to WP7)	06.04.2016	UK	1	
Teacher interview / discussion (WP9; not reported to WP7)	25.04.2016	UK	1	
Classroom ILS delivery (WP9; not reported to WP7)	09.05.2016	UK	7	

Activity	Date(s)	Country	Nr. of participants	Link (if available)
Classroom ILS delivery (WP9; not reported to WP7)	16.05.2016	UK	5	
Classroom ILS delivery (WP9; not reported to WP7)	06.06.2016	UK	7	
Classroom ILS delivery (WP9; not reported to WP7)	22.06.2016	UK	23	
Classroom ILS delivery (WP9; not reported to WP7)	22.06.2016	UK	16	
Classroom ILS delivery (WP9; not reported to WP7)	06.07.2016	UK	23	
Classroom ILS delivery (WP9; not reported to WP7)	06.07.2016	UK	16	
Presentation + ILS delivery in school (WP9; not reported to WP7)	20.09.2016	UK	26	
EVENTS IN COOPERATION WITH OTHER PROJECTS				
YCS Award	15.12.2015	Austria	80	
OnlineLabs4All - General Assembly meeting	12.05.2016	Austria	50	
Presentation at Young Citizen Science (YCS) Award 2016	13.12.2016	Austria	80	http://www.youngscience.at/young_citizen_science/citizen_science_award_2016/onlinelabs4all/
Go-Lab Workshop @ TI DLP Event	11.01.2016	Belgium	12	http://fcl.eun.org/dlp-pilot
Go-Lab Workshop @ TI DLP Event	23.05.2016	Belgium	12	http://fcl.eun.org/dlp-pilot
Scientix Science Projects Networking Event Nr 8	17.10.2015	Belgium	25	http://www.scientix.eu/web/guest/spw8-at-fcl
Scientix, Science Projects Workshop Nr 8 @ Future Classroom Lab	18.10.2015	Belgium	73	http://www.scientix.eu/web/guest/spw8-at-fcl
Go-Lab presentation for related projects at the 9th Scientix project's networking event	06.11.2015	Belgium	15	http://www.scientix.eu/web/guest/networking-event/9th-spne-before
Go-Lab workshop for Heads of Schools at the 9th Science Projects Workshop in the Future Classroom Lab	07.11.2015	Belgium	20	http://www.scientix.eu/web/guest/spw9-at-fcl
Go-Lab presentation at the 9th Science Projects Workshop in the Future Classroom Lab	07.11.2015	Belgium	25	http://www.scientix.eu/web/guest/spw9-at-fcl
Scientix Science Projects Networking Event Nr 10	26.02.2016	Belgium	50	http://www.scientix.eu/web/guest/networking-event/10th-spne-before
Go-Lab two introductory workshops at the 12th Science Projects Workshop in the Future Classroom Lab "Innovative Practices in Inquiry Based Learning"	04.06.2016	Belgium	29	http://goo.gl/5GjFzF
Go-Lab hands-on workshops at 12th Science Projects Workshop in the Future Classroom Lab	04.06.2016	Belgium	30	http://tutoring.golabz.eu/forum/events/%E2%80%9Cstem-discovery-week-innovative-practices-inquiry-based-learning%E2%80%9D-future-classroom-lab
Two workshops at the STEM Discovery Week: What is happening in my Inquiry Learning Space?	05.06.2016	Belgium	25	
Go-Lab sustainability workshop at the 12th Science Projects Workshop in the Future Classroom Lab "Innovative Practices in Inquiry Based Learning"	05.06.2016	Belgium	16	http://goo.gl/5GjFzF
Meeting of the "Online laboratories IEEE standard and industry collaboration" group	21.07.2016	Costa Rica	20	http://laccei.org/index.php/events/oas-engineering-for-the-americas/ieee-workshop-and-industry-collaboration-inititaive

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Go-Lab presentation at Inspiring Science Education conference	23.04.2016	Greece	10	http://ise-conference2016.ea.gr/
Presentation of Go-Lab to the FORGE project by Denis Gillet	05.11.2015	Ireland	15	
Keynote at Global Hands-On Universe event	27.08.2016	Norway	50	
Presentation at Global Hands-On Universe event	22.08.2016	Norway	50	
Scientix Polish National conference	08.10.2015	Poland	100	http://scientix.pl/program-konferencji/
Go-Lab workshop at Scientix Portugal	13.11.2015	Portugal	30	
GTTP in Principe Island - Go-Lab presentation to education stakeholders in the island	08.03.2016	São Tomé e Principe	90	
Presentation of Go-Lab to central European Countries (Go-Lab - SCOPES projects)	29.01.2016	Serbia	20	
IEEE Standardization meeting P1876 at REV'16 in Madrid	25.02.2016	Spain	20	
PROJECT BOOTHS AND LEAFLET DISTRIBUTION				
Long night of research Klagenfurt	22.04.2016	Austria	50	
Ecsite Annual Conference, Graz, Austria	11.06.2016	Austria	300	http://www.ecsite.eu/annual-conference
FH Engineering & IT day	24.06.2016	Austria	50	
Poster presentation and Go-Lab dissemination during the conference «Integration of ICT in Learning Process»	21.05.2016	Cyprus	20	
Distributing leaflets during educational event in the 24th Tartu Education Fair INTELLEKTIKA	12.02.2016	Estonia	30	http://www.intellektika.ee
Distributing leaflets during Earli SIG 20 & SIG 26 meeting.	28.08.2016	Estonia	30	
Establishing contact and distribution of flyers at the Forum "Bildung und Digitalisierung" (in scope of "IT-Gipfel") for representatives of German private foundations active in school education: Bertelsmann Stiftung, Stiftung Mercator, Robert Bosch Stiftung, Siemens Stiftung + German Ministry of Education	18.02.2016	Germany	12	
Go-Lab booth at the World Science Day organized by UNESCO	10.11.2015	Portugal	100	https://goo.gl/photos/JMMxDDSA83kzEHbD9
Go-Lab booth at Eminent 2015	20.11.2015	Spain	257	
Cite de metiers Geneva (City of professions)	08.11.2015	Switzerland	100	http://www.citedesmetiers.ch/geneve
Scope Days (French-speaking Swiss conference which aims to discuss the new generation of young scientists, challenges for science education in schools as well as the extra-value of extracurricular MINT)	10.11.2015	Switzerland	20	http://scopedays.ch
Booth for Graasp.eu, Salon SwissTECH EPFL	16.03.2016	Switzerland	200	
European Researcher's night in Geneva	01.09.2016	Switzerland	50	http://ec.europa.eu/research/researchersnight/about_en.htm
Big Bang Fair, Birmingham NEC	17.03.2016	UK	1.000	https://www.thebigbangfair.co.uk
Science at the Stadium, Goodison Park, Liverpool	15.05.2016	UK	400	
Cheltenham Science Festival	12.06.2016	UK	10.000	http://www.cheltenhamfestivals.com