

# 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 D9.1

## Project Website and Dissemination Materials

Editor	Diana Dikke (IMC)
Date	25 April 2013
Dissemination Level	Public
Status	Final



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## Executive Summary

The Go-Lab Project (Global Online Science Labs for Inquiry Learning at School) is a European collaborative project co-funded by the European Commission and uniting nineteen organizations from twelve European countries. Go-Lab supports inquiry-based learning in schools by providing access to online (remote and virtual) laboratories in order to enrich classroom experience in schools as well as learning activities out-of-class. The project aims at providing students the opportunity to gain hands-on experience in science by conducting experiments using modern laboratory equipment by themselves, deepen their knowledge in fundamental science, and to motivate them for making scientific career in the future.

Go-Lab creates an infrastructure (the Go-Lab Portal) to provide access to a set of online labs from worldwide renowned research organizations and institutions, which can be used by universities, schools, instructors, and lifelong learners to extend their regular teaching and learning activities. To support pedagogical and methodological aspects of this approach, Go-Lab will create a teacher community allowing them sharing and discussing their experiences and providing mutual support. Further, Go-Lab will support this community by offering workshops introducing the use of virtual experimentations and remote labs, as well as inquiry-based teaching techniques, allowing instructors to upgrade their current practices.

Thus, the Go-Lab project targets both individual stakeholders (school teachers, instructional designers, researchers, students, and lifelong learners wanting to use online labs in their learning and teaching activities) and organizational stakeholders (lab owners, such as research institutions, universities, and private companies; schools that may want to use inquiry learning methods in the everyday teaching practice; other educational providers wanting to extend their existing learning programs and create new ones). Further, the Go-Lab project might be interesting for political decision makers who might support implementation of inquiry learning at schools at the institutional level.

In order to reach identified target groups and to promote the Go-Lab approach among them, the Go-Lab Project uses online and offline dissemination channels, activities and materials. Promotional activities of the project concentrate on the establishment of direct contacts between project consortium and its target groups by offering visionary workshops and training events for teachers, and by attracting organizational stakeholders to participate in project activities: providing access to the online labs via the Go-Lab Portal, extending educational programs with inquiry learning activities, and conducting joint research activities. To support the dissemination of the project and promotional events, a project website, social media channels, and various print materials, such as leaflets, flyers, and roll-ups have been created.

This Deliverable describes Go-Lab project website as the main online dissemination channel providing information about the project, its approach and results, as well as being a connecting point for social media channels, such as communities and content sharing platforms, used by the project. The Deliverable represents both the user interface (website structure and navigation, content types, and communication tools), as well as the developer interface (Content Management System Drupal). The Deliverable also represents print dissemination materials, which are attached to this Deliverable as PDF-files for print. Particular dissemination activities and their impact will be represented in the Deliverable D9.2 Report of Dissemination and Exploitation Activities – Year 1 (M12).

# Table of Contents

<b>1</b>	<b>Introduction.....</b>	<b>6</b>
<b>2</b>	<b>Go-Lab target groups and communication channels.....</b>	<b>7</b>
2.1	<b>Individual stakeholders .....</b>	<b>7</b>
2.2	<b>Organizational stakeholders .....</b>	<b>7</b>
2.3	<b>Other stakeholders.....</b>	<b>8</b>
2.4	<b>Target groups communication.....</b>	<b>8</b>
2.5	<b>Project website as the main communication channel .....</b>	<b>8</b>
<b>3</b>	<b>Website Structure and Content .....</b>	<b>10</b>
3.1	<b>Website Structure and Navigation .....</b>	<b>10</b>
3.2	<b>Main Page Types .....</b>	<b>11</b>
3.2.1	General Content.....	11
3.2.2	Online Labs.....	12
3.2.3	Workshops.....	13
3.2.4	Project Partners .....	13
3.2.5	Downloadable Content.....	14
3.3	<b>Contact &amp; Communication .....</b>	<b>14</b>
3.3.1	Social Media Channels.....	15
3.3.2	Newsletter and Contact Forms.....	15
3.4	<b>Content contribution, editing, and update.....</b>	<b>15</b>
<b>4</b>	<b>The Go-Lab website content management system .....</b>	<b>16</b>
4.1	<b>Requirements and system selection.....</b>	<b>16</b>
4.2	<b>Configuration and implementation .....</b>	<b>16</b>
4.2.1	Servers and installations .....	17
4.2.2	Content types and views .....	17
4.3	<b>Layout .....</b>	<b>19</b>
4.3.1	Responsive/adaptive themes for website layout.....	19
4.3.2	Lessons learned.....	19
<b>5</b>	<b>Print Dissemination Materials.....</b>	<b>20</b>
<b>6</b>	<b>Conclusion.....</b>	<b>21</b>

## 1 Introduction

The Go-Lab Project (Global Online Science Labs for Inquiry Learning at School) aims to support inquiry learning in schools by giving students the opportunity to gain hands-on experience in science by conducting experiments using modern laboratory equipment by themselves and deepen their knowledge in fundamental science. Go-Lab creates technical infrastructure providing access to a set of online labs from worldwide renowned research organizations and institutions and supports pedagogical and methodological aspects of inquiry learning implementation. Further, the project creates the teacher community by offering workshops introducing the use of virtual experimentations and remote labs, as well as inquiry-based teaching techniques, allowing instructors to upgrade their current practices.

The Go-Lab project targets both individual stakeholders (school teachers in the first place, but also instructional designers, researchers, and students), organizational stakeholders (lab owners and educational providers), as well as political stakeholders, who might support implementation of inquiry learning at schools at the institutional level. In order to reach these diversified target groups and to promote the Go-Lab approach among them, Go-Lab uses both online and offline dissemination channels. Online dissemination channels include the project website, various social media channels, and the project blog<sup>1</sup>; offline dissemination implies organization of visionary workshops and trainings, as well as presence of the project at scientific conferences and exhibitions.

The project website ([www.go-lab-project.eu](http://www.go-lab-project.eu)) is the main dissemination channel used by the project, as it reaches all identified target groups. It provides information about the project, its research activities, online laboratories, workshops, and important results, and serves as a connecting point for the social media channels. Further, after the Go-Lab technical infrastructure is developed, the project website will provide access to the Go-Lab Portal and Bartering Platform, thus, being the main entrance to all Go-Lab platforms, services, and resources. Finally, the project website establishes connection to offline dissemination activities not only promoting them, but also providing print materials, scientific papers, and official deliverables for download. Contact information of consortium partners (organizations and persons working for the project) can also be found on the website.

This Deliverable briefly describes Go-Lab target groups and provides an overview of the online and offline communication channels used to reach them ([Section 2](#)) concentrating, however, on the project website as the main communication channel. [Section 3](#) describes the website structure and navigation, user and author interfaces, main content types (page types), as well as social media accessible from the website and other communication possibilities provided for the stakeholders. [Section 4](#) represents the Content Management System (Drupal 7) and technical implementation of the website including its configuration and layout development. Additionally, [Section 5](#) provides information about print materials (standard materials and reusable templates) created to support offline promotion of the project. Annexes A, B, C, and D provide the described materials as PDF-files for print.

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<sup>1</sup> This will be created by M9

## 2 Go-Lab target groups and communication channels

The Go-Lab project aims at involving both individual and organizational stakeholders in project activities as active participants and contributors. Whereas individual stakeholders, first of all school teachers, instructional designers, and students, are seen as “consumers” of the project results using provided infrastructure to extend learning and teaching activities, organizational stakeholders (lab owners and educational providers) are expected to actively contribute to the project development. Main stakeholder groups and their interests are briefly described below.

### 2.1 Individual stakeholders

The most important target group of the project is the **school teachers** interested in extending their current teaching methods with inquiry-based learning activities. In order to support teachers and instructors in using Go-Lab methods and infrastructure, the project offers visionary workshops informing in general about the Go-Lab approach, training workshops aiming at creating practice-oriented scenarios that can be implemented at schools, as well as evaluation workshops gathering best practices and experience reports after the implementation.

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

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

### 2.2 Organizational stakeholders

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

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

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

## 2.3 Other stakeholders

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

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

## 2.4 Target groups communication

To reach the project target groups and to support communication between them, online and offline communication channels and activities are foreseen. The project aims to make communication with its stakeholders as personal as possible; thus, personal contacts, workshops and events, as well as the usage of social media by the consortium members are extremely important. Dissemination activities and their impact will be reported in the Deliverable D9.2 Report of Dissemination and Exploitation Activities – Year 1 (M12).

School teachers are mainly supported with the Go-Lab workshops and contact to consortium members. They may exchange their experiences and best practices in the teacher community and on the Bartering Platform. Further, relevant information like experience reports will be published on the project blog<sup>2</sup>. Finally, teachers may be kept informed about the project news visiting the website and subscribing to the project social media channels.

Researchers and learning designers are mainly addressed by the online dissemination channels, especially the project blog, where scientific and practice oriented articles will be posted. Also press releases and scientific publications in conference proceedings and journals are relevant for this group. Students and lifelong learners are addressed primarily by the social media channels, such as Facebook and Google+ groups, as well as Twitter.

Online lab and educational providers, as well as combined providers, may find the most important information on the project website, as well as on the blog. However, the main contact point for these stakeholders will be the Bartering Platform allowing arranging the usage of the online labs of other institutions. Political stakeholders may be reached mostly with personal contact. General public is addressed with the project website and social media channels.

## 2.5 Project website as the main communication channel

The Go-Lab project website serves as the main online contact point, which is also a basis and a connecting link between other online dissemination channels. The Go-Lab project website provides comprehensive information about the project, representing both the research and the target group oriented sides. The project website serves as the main online contact point for all interested stakeholders: lab-owners, teachers, students, but also individual researchers and institutions wanting to participate in the project activities. Thus, the website aims at providing relevant messages for each target group and connecting interested stakeholders with responsible consortium members.

The Go-Lab project will actively use other websites (e.g. partner websites), online blogs and newsletters to announce project-relevant news, workshops and events. The Go-Lab project website will allow navigating to the Go-Lab Portal, Go-Lab Bartering Platform, and Go-Lab Blog, as well as links to relevant internet resources, thus, being an entrance point to all Go-Lab platforms, services, and resources.

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<sup>2</sup> This will be created by M9

Further, social networks, such as LinkedIn, Facebook, Google+, etc. will be used to create a community around the project. Other Web 2.0 media, such as YouTube and SlideShare, will be used to disseminate project related resources. All these online dissemination channels will be connected to the project website; moreover, together with usual contact information, partner contact information in social networks will be available. Both centralized content management (e.g. in project groups and channels) and individual contributions of particular project consortium members, but also external stakeholders, will be supported. News announced on the website will be disseminated via the Web 2.0 channels; and vice versa, interesting discussions and postings from social media will appear in the website news.

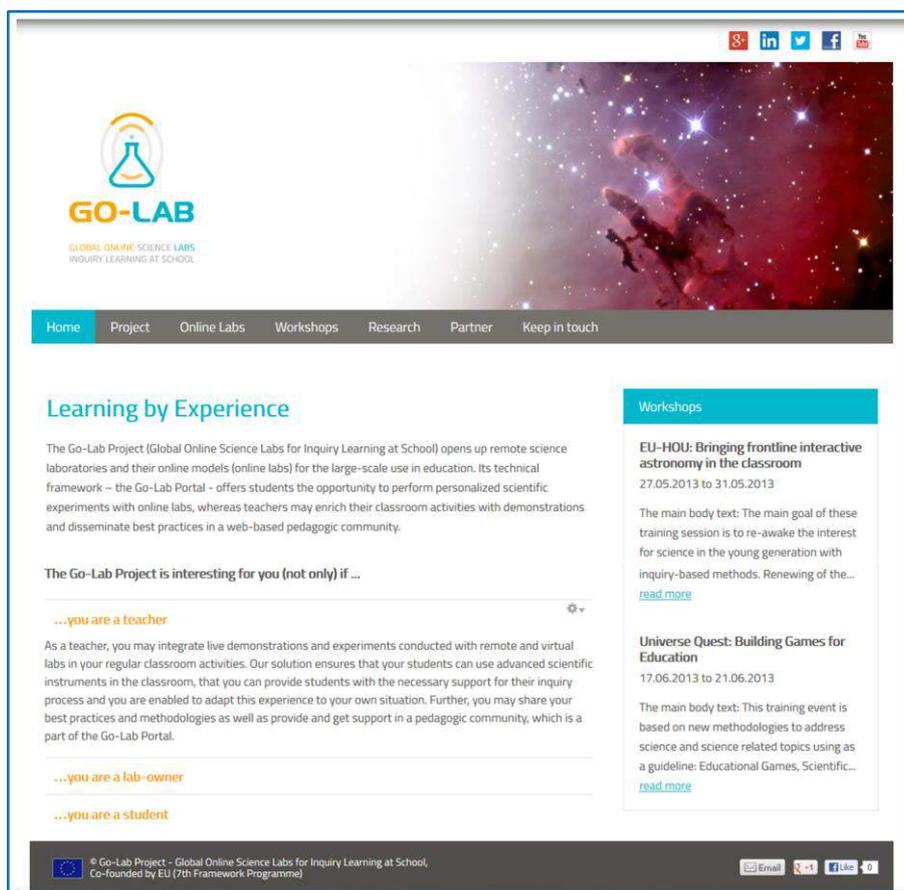
Also offline dissemination activities are supported by the project website: workshops, trainings and project-related events are announced here. In the download area project brochures and flyers will be made available for download and print. Furthermore, the Go-Lab project website will provide information about the Go-Lab Cooperation Program (for organizational lab-owners and educational providers, but also political stakeholders and other decision-makers in educational area) and personal contact to the responsible consortium members. Building of the teacher community will be supported. Thus, the Go-Lab project website will become the main communication channel supporting both online and offline activities of the consortium.

### 3 Website Structure and Content

This section describes the user interface of the Go-Lab project website: its structure, main menu and content types (the so-called page types containing various kinds of information, such as lists of online labs, workshop announcements, downloadable materials, etc.), communication channels and available contact possibilities, as well as content editing and update procedure. For some page types also the author view is represented. The Content Management System and technical implementation of the website are described in the [Section 4](#).

#### 3.1 Website Structure and Navigation

The Go-Lab project website ([www.go-lab-project.eu](http://www.go-lab-project.eu)) provides information about the project, its approach, technical infrastructure, organized workshops and events, project results, as well as contact information. The Homepage (see Figure 1) gives the first impression about the project providing target group specific project description (main text bloc with accordion menu), overview of the latest news (box on the right of the page), main navigation menu, access to social media project pages (on the top), as well as social media sharing buttons (on the bottom of the page).



**Figure 1: Go-Lab project website: Homepage**

Main navigation menu provides access to seven main parts of the website:

- Home: allows the user to return to the Homepage from any other part of the website.
- Project: this area contains general information about the project, its vision and objectives, as well as proposed solution.
- Online Labs: here the user can find a short explanation of what the online labs are, as well as the list of remote labs, virtual labs, tools and resources provided by the project.

- Workshops: upcoming and past workshops organized by the Go-Lab project and by the third parties together with Go-Lab partners are listed in this directory. Links to workshops' websites are provided.
- Research: this area represents the Go-Lab research results, such as available prototypes, project deliverables, and scientific publications. Information on inquiry learning cycle and pedagogic scaffolds will be added as soon as it is available from other work packages.
- Partners: currently, only Go-Lab consortium partners are listed on this page. During the project time, this area will be extended listing external cooperation partners, e.g. those providing access to their online labs.
- Keep in touch: this directory provides main contact information, contact form, newsletter registration form, and an overview of social media channels used by the project.

The Go-Lab project website will be extended and further developed during the whole project time. In order to keep complex content comprehensible, advanced search and filtering tools, as well as search hints (the so-called "quick links") on the right of each page will be implemented.

## 3.2 Main Page Types

In order to provide better visualization of the content and to simplify navigation, several page types were created. These page types represent the content in different ways and provide appropriate filtering functionalities. Further, they simplify entering of the content by the authors and automatically structure and render it on particular pages.

### 3.2.1 General Content

General content pages are simple content pages containing main text bloc and navigation hints on the right of the page<sup>3</sup>. The Project<sup>4</sup> and Research<sup>5</sup> pages, as well as their sub-pages are structured according to this type (see Figure 2).

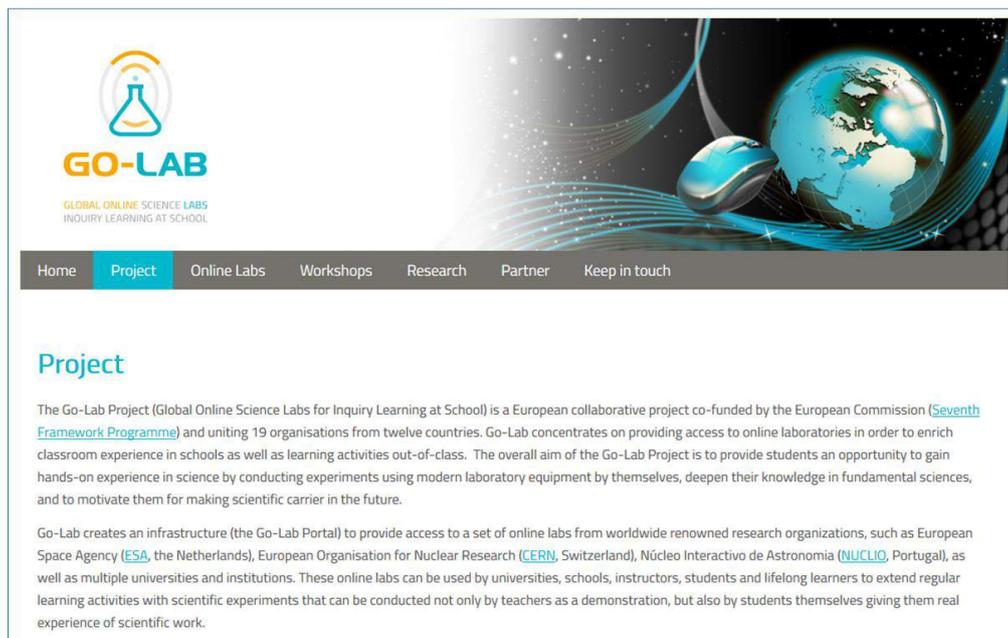


Figure 2: Page type: General content

<sup>3</sup> This will be added by M7

<sup>4</sup> <http://www.go-lab-project.eu/project>

<sup>5</sup> <http://www.go-lab-project.eu/research>

The author interface contains simple What-You-See-Is-What-You-Get (WYSIWYG) editor allowing to easily add texts, links, and images (see Figure 3). This editor is available for all further page types.

The screenshot shows a WYSIWYG editor interface. At the top, there is a 'Title' field containing the word 'Project'. Below it is the 'Body' section, which includes a rich text editor with a toolbar and a text area containing two paragraphs of text. The first paragraph describes the Go-Lab project as a European collaborative project co-funded by the European Commission (Seventh Framework Programme) and uniting 19 organisations from twelve countries. The second paragraph describes the Go-Lab infrastructure (the Go-Lab Portal) and lists several research organizations it provides access to, such as ESA, CERN, and NUCLEO. Below the text area, there is a 'Text format' dropdown menu set to 'WYSIWYG' and a 'More information about text formats' link. At the bottom, there are 'Menu settings' and a checkbox labeled 'Provide a menu link' which is checked.

**Figure 3: General content: WYSIWYG editor**

### 3.2.2 Online Labs

Each online laboratory or tool listed on the Go-Lab project website has its own page (not displayed in the main navigation), where the metadata (science subject(s) and language(s) of the lab, required software, thumbnail, web link, etc.), as well as a short description can be added by the author (see Figure 4).

The screenshot shows the metadata entry fields for an online lab page. It includes a 'Subject' field with the value 'Astronomy', a 'Language' dropdown menu with 'English' selected, and two checkboxes: 'Registration needed' (checked) and 'Installation needed' (unchecked). There is a 'Weblink' field containing the URL 'http://www.faulkes-telescope.com'. Below this is a section titled 'ADDITIONAL SOFTWARE' with a 'Title' field and a note that 'The link title is limited to 128 characters maximum.' At the bottom, there is an 'Add another item' button.

**Figure 4: Online Lab page: Metadata entry fields**

Entering each data set in its own entry field allows to implement filtering functionality and sorting labs in the list according to type (remote laboratories, virtual labs and simulations, and tools and resources), subject and language. Thus, the user sees complete list of labs and tools and can rearrange them using the filtering functionality (see Figure 5).

<p><b>Salsaj</b></p>  <p><b>Subject:</b> Astronomy <b>Language:</b> English, French, Italian, Spanish, Greek, Arabic, Chinese, Northern Sami, Polish, Portuguese, Swedish <b>Weblink:</b> <a href="#">Link</a> <b>Registration needed:</b> No <b>Installation needed:</b> Yes</p> <p>Salsaj is free, student-friendly software developed specifically for the EU-HOU project. Salsaj allows students to display, analyse, and explore real astronomic images and other data in the same way that professional astronomers do, making the same kind of discoveries that lead to true excitement about science.</p> <p><b>ESA Kids</b></p>  <p><b>Subject:</b> Astronomy <b>Language:</b> English <b>Weblink:</b> <a href="#">Link</a> <b>Registration needed:</b> No <b>Installation needed:</b> No</p> <p>ESA Kids is workspace for primary school students, which includes news, background information, animations, videos, games and hands-on activities.</p>	<p><a href="#">Mathematics (2)</a> <a href="#">Multiple (2)</a> <a href="#">Astrophysics (1)</a> <a href="#">Electromagnetism (1)</a> <a href="#">Engineering (1)</a> <a href="#">Environmental Sciences (1)</a> <a href="#">Metereology (1)</a> <a href="#">Natural sciences (1)</a> <a href="#">Show more</a></p> <p><b>Filter by language:</b></p> <p><a href="#">English (26)</a> <a href="#">French (9)</a> <a href="#">German (9)</a> <a href="#">Italian (7)</a> <a href="#">Portuguese (7)</a> <a href="#">Spanish (7)</a> <a href="#">Dutch (6)</a> <a href="#">Greek (5)</a> <a href="#">Danish (4)</a></p>
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Figure 5: List of online laboratories<sup>6</sup>

### 3.2.3 Workshops

The Workshop page type is organized based on the same principle as the Online Lab type: the author provides data and defines a type (upcoming or past workshop), so that the workshops are automatically sorted and displayed in the list. At the Workshop page<sup>7</sup>, workshops can be filtered by type and country, where they will take place (see Figure 6).

<p><b>Workshops</b></p> <p>Together with project external partners, Go-Lab organises workshops and events in many European countries targeting primarily school teachers, but also scientific organisations and researchers interested in providing or using online labs, in order to introduce the use of virtual experimentations and remote laboratories as well as inquiry-based science teaching techniques to support regular classroom activities.</p> <p>Please use the filters on the right to find workshops conducted in your country.</p> <p><b>EU-HOU: Bringing frontline interactive astronomy in the classroom</b></p>  <p><b>27.05.2013 to 31.05.2013</b> <b>Paris, France</b> The main goal of these training session is to re-awake the interest for science in the young generation with inquiry-based methods. Renewing of the teaching of science is fulfilled through astronomy... <a href="#">read more</a></p> <p><b>Universe Quest: Building Games for Education</b></p>  <p><b>17.06.2013 to 21.06.2013</b> <b>New Castle upon Tyne, United Kingdom</b> This training event is based on new methodologies to address science and science related topics using as a guideline: Educational Games, Scientific Illustration and Astronomy. Games for education are... <a href="#">read more</a></p>	<p><b>Country</b></p> <p><a href="#">Greece (8)</a> <a href="#">Portugal (2)</a> <a href="#">Estonia (1)</a> <a href="#">Finland (1)</a> <a href="#">France (1)</a> <a href="#">Italy (1)</a> <a href="#">United Kingdom (1)</a></p> <p><b>Workshops</b></p> <p><a href="#">Upcoming (15)</a></p>
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Figure 6: List of upcoming workshops

### 3.2.4 Project Partners

Each Project Partner page provides a description of a partner organization and general contact information (see Figure 7). Selected showcases (e.g. descriptions of one or several previous projects or project results thematically connected with Go-Lab and/or having relevance for

<sup>6</sup> <http://www.go-lab-project.eu/online-labs>

<sup>7</sup> <http://www.go-lab-project.eu/workshops>

current Go-Lab project activities), as well as and social media contacts of particular consortium members will be added<sup>8</sup>.

### University of Deusto

The University of Deusto is a private and fully recognized university with 997 members of staff and more than 12,000 students. Academic excellence of the University of Deusto is reflected in its commitment to innovative methods of learning, particularly in the new methodology of competence-based learning, own methodology of teaching, learning and assessment in a learner-based approach, and incorporation of new technologies as tools for quality education with an emphasis in meaningful learning and efficiency.

In Go-Lab, the Faculty of Engineering of UDEUSTO is represented by the WebLab-Deusto, Mobile Communications Research Group, and DeustoTech Learning. Since 2004, the Faculty of Engineering provides a remote laboratory WebLab-Deusto for technical curricula. The remote lab is integrated in the current teaching/learning with LMS, Facebook, and mobile devices. WebLab-Deusto offers different experiments in physics and technologies including logic games and one related to embed systems development. The group participates in many national and international projects, among others OLAREX, CLJPFLAX, E-Pragmatic, RexNet, CITA2, SocialTechBook, PiP-PDI, and sLabs.

The Mobile Communications Research Group hosts SmartLab, a mobile and pervasive computing laboratory, where prototypes of ubiquitous computing and ambient intelligence scenarios are designed, deployed and tested in order to experiment with future environments where intelligence is provided by surrounding objects, especially mobile phones. The group has a strong background in the application of Semantic Web and Artificial Intelligence techniques to middleware for embed and mobile system in order to foster context-aware reactivity. MORElab participates in multiple projects, such as MUGGES, uService, CBDP, SABESS, PIRAmIDE, and ACROSS.

In Go-Lab, the Faculty is involved in WP4 (Go-Lab Infrastructure), WP5 (Go-Lab Portal), WP7 (Large-scale pilots), WP8 (Evaluation and Validation), and WP9 (Dissemination and Exploitation). UDEUSTO will act as National Coordinator of the project's implementation in Spain.



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**Figure 7: Project Partner page (UDEUSTO)<sup>9</sup>**

### 3.2.5 Downloadable Content

This page type is used to create web pages, on which the user may download materials in PDF-format. Publications<sup>10</sup>, Deliverables<sup>11</sup>, and Downloads<sup>12</sup> pages are created based on this type. For each downloadable material (publication, deliverable, flyer, press release, etc.) its own page (not displayed in the main navigation) containing metadata and the document itself is created. The documents are displayed in a list on the corresponding overview pages (see Figure 8). Publication and Deliverable page types are described in more detail in the section [4.2.2 Content types and views](#).

### Publications

2013

De Jong, Ton; Linn, Marcia C.; Zacharia, Zacharias C.: Physical and Virtual Laboratories in Science and Engineering Education. In: Science 19 April 2013: Vol. 340 no. 6130, p. 305-308. Publication Publisher: American Association for the Advancement of Science, Washington, 2013. [Download](#)

[Gillet, Denis; de Jong, Ton; Sotirou, Sofoklis; Salzmann, Christophe](#): Personalised Learning Spaces and Federated Online Labs for STEM Education at School: Supporting Teacher Communities and Inquiry Learning. In: Proceedings of the 4th IEEE Global Engineering Education Conference (EDUCON), p. 769-773. Publication Publisher: IEEE, Berlin, Germany, 2013. [Download](#)

**Figure 8: Downloadable Content: Publications**

## 3.3 Contact & Communication

The Go-Lab project website provides general contact information (for the whole project), contact information of each organization participating in the project (particular Project Partner pages), as

<sup>8</sup> This will be done by M7

<sup>9</sup> <http://www.go-lab-project.eu/partner/university-deusto>

<sup>10</sup> <http://www.go-lab-project.eu/publications>

<sup>11</sup> <http://www.go-lab-project.eu/deliverables>

<sup>12</sup> This will be done by M7

well as social media contacts of persons working for the project<sup>13</sup> (also at Project Partner pages). Also, the project disseminates its news and other relevant information via social media channels. People interested in receiving the recent news per e-mail may register for the newsletter on the project website. Further sections briefly describe communication and contact possibilities provided by the Go-Lab project for its stakeholders.

### 3.3.1 Social Media Channels

The Go-Lab Project Provides community groups and pages, as well as content sharing channels on the following social media platforms:

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

Facebook, Google+ and LinkedIn groups, as well as Twitter and YouTube channels can be accessed via the social media panel on the top of each page; the Go-Lab website can also be shared via e-mail, on Facebook and on Google+ using the buttons on the bottom of each page. An overview of all social media channels is provided in the Keep in Touch directory of the website<sup>14</sup>.

### 3.3.2 Newsletter and Contact Forms

The users interested in contacting the project consortium (e.g. in case of specific questions) and/or in receiving the project newsletter, which will be published quarterly, can use the respective contact<sup>15</sup> and newsletter registration<sup>16</sup> forms on the project website. Apart of its registration function, the newsletter registration form helps the Go-Lab project to gather information about its stakeholders, such as country, business sector, areas of interests, etc., which can be used to make the website and the newsletter content more target group specific.

## 3.4 Content contribution, editing, and update

IMC, as the WP9 leader, is responsible for the website technical implementation, content, and design. The website structure and content are mainly created by IMC and are approved by the project management; however, special content parts like information about the consortium partners and upcoming events are contributed by the partners. During the project time, the project partners will contribute information about the workshops they organize, research results that have been achieved, scientific papers published, and so on. This can be done on request of IMC or project management, but also as initiative of a particular partner. The content is edited and published by IMC. The Go-Lab project website will be extended and further developed during the whole project time. Thus, in order to keep complex content comprehensible, the website navigation might be changed and/or new search, filtering, and recommendation functionalities can be implemented.

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<sup>13</sup> This will be done by M7

<sup>14</sup> <http://www.go-lab-project.eu/social-media>

<sup>15</sup> <http://www.go-lab-project.eu/contact>

<sup>16</sup> <http://www.go-lab-project.eu/newsletter>

## 4 The Go-Lab website content management system

To implement and host the Go-Lab project website, one of the existing well-supported Content Management Systems (CMS) Drupal 7 is used taking advantages of its comprehensive functionalities. On the one hand, it provides robust complex features allowing developing a website within a shorter period of time than from scratch. On the other hand, the CMS supports configuration, new features, and continuous development of websites, which keeps the Go-Lab website technically up to date.

### 4.1 Requirements and system selection

A robust Content Management System has been selected to host and implement the Go-Lab website according to the requirements from the user interface aspect, community support aspect, as well from the system aspect.

Requirements from the user interface aspect:

- **Responsive** website design to fit various display screen sizes of desktops, laptops, tablet PCs, and smartphones;
- Easy, friendly, and intuitive user interface;

Requirements from the community support aspect:

- Permission and role management to support different roles (e.g. author, editor);
- Enabling users to edit website if necessary;
- **Sort and display** of content for different website browsing and navigation requests;
- Seamless integration of **social media**, e.g. Facebook and Twitter;

Requirements from the system aspect:

- Persistent storage of the website content;
- Low-cost website maintenance in the future;
- **Cost-free** CMS.

After a survey of the existing CMS', the latest Drupal version (Drupal 7, <http://drupal.org>) has been selected to meet these complex requirements. Drupal is supported by the developer community and is based on an extendable modular system. Developers can contribute to Drupal by adding modules supporting certain features or functions. For example, the Email module defines an email field type and offers secure encoded e-mail address display on websites. The data storage in MySQL is completely supported by Drupal in a transparent way. Thus, the developers do not need to take care of data storage very much. Moreover, Drupal supports various website elements, such as blocks and panels for good layout design.

Compared to the previous Drupal versions, Drupal 7 has an even more powerful and larger module repository. It is flexible for developers to select useful modules for different features and functions. Furthermore, the main Go-Lab website developer - IMC - has much positive experience with Drupal in their previous work in website development for the EU projects ROLE<sup>17</sup> and KOMMIT<sup>18</sup>.

### 4.2 Configuration and implementation

The Drupal Content Management System is on top of the Apache server and is implemented mainly in the programming language PHP. Drupal has an easy-to-use set-up user interface for

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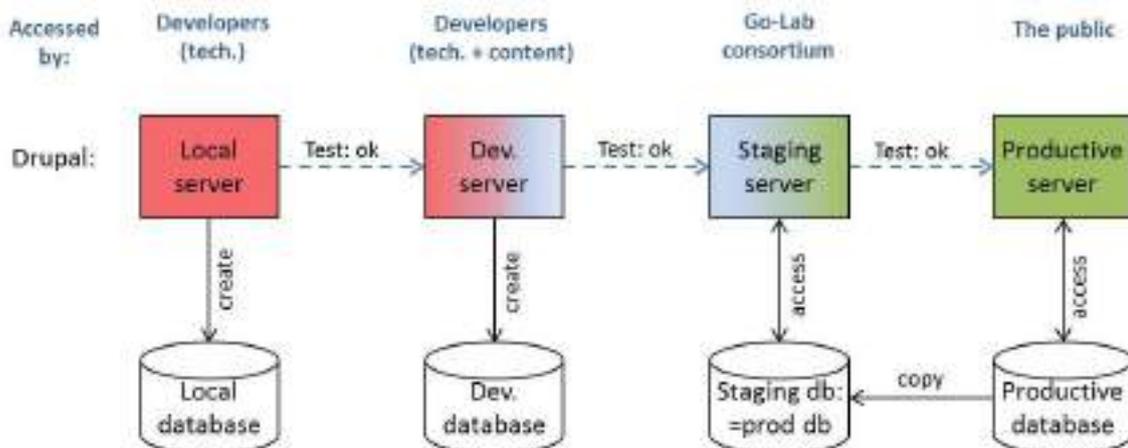
<sup>17</sup> [www.role-project.eu](http://www.role-project.eu)

<sup>18</sup> [www.kommit-projekt.de](http://www.kommit-projekt.de)

system configuration and the background database – MySQL. The content implementation is realized through nodes.

#### 4.2.1 Servers and installations

The development circle of the Go-Lab website consists of four phases conducted on servers with separate Drupal 7 instances: local server, development server, staging server, and productive server (as depicted in Figure 9). The website is tested in three rounds before it is released to the public. On the local and development servers, the Drupal CMS is developed, while their databases are only for testing. Similarly, the database of the staging server is created by adding new codes of Drupal; the Drupal CMS is tested with the copy of the productive database. The data on productive database are taking backups regularly.



**Figure 9: The development circle of the Go-Lab website**

This development circle assures thorough test rounds by the developers with the focus on technology development and content design, as well as by the Go-Lab consortium members with the focus on the website usability. The content is maintained in the productive database with a persistent storage ensuring consistency.

The Apache server with PHP modules is installed on the servers in order to keep Drupal running. On each server, the same version of Drupal is installed and updated respectively. The detailed implementation is packed in extensible Drupal modules and passed to different servers.

The transfer of detailed implementations is realized by the Drupal 7 features. All configurations are stored in various features respectively. The features are saved as modules, which are one of those Drupal extensible modules besides the standard ones.

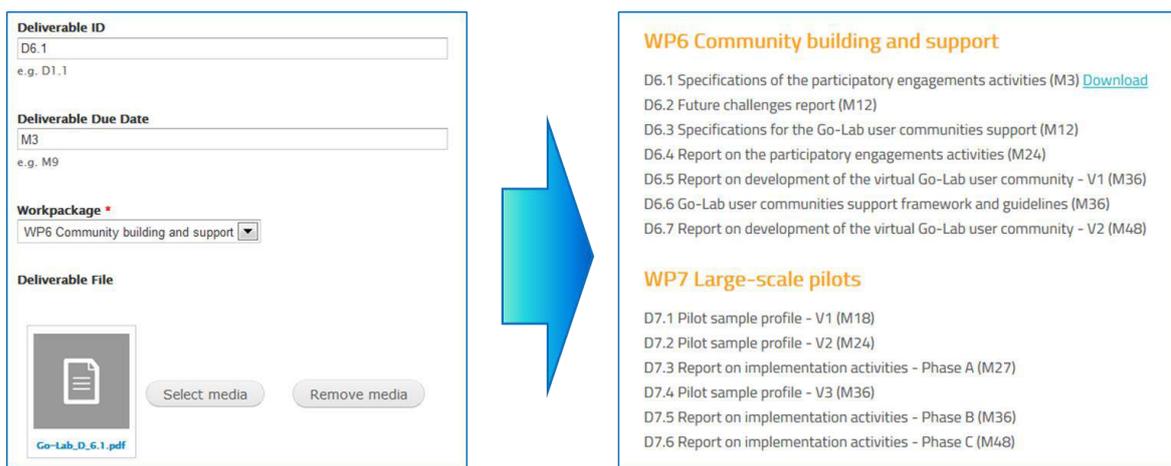
#### 4.2.2 Content types and views

Individual web page elements in Drupal are stored as nodes. There are two predefined basic content types: either a basic page or a story, which is similar to an article in a blog. They are predefined by Drupal from the installation. Drupal allows website developers to create their own content types for better content management. A content type is specified by various fields, which are embedded in the certain content type. Accordingly, each field in a content type can be accessed, displayed, and managed via its machine identifiers. Thus, the developers are able to manage single content elements within one web page. Content type field management includes label and field type specification. Field types are basic text, number, Boolean, or specified complex types, e.g. a field collection, a predefined image type, or even a selective image type defined by developers.

For the Go-Lab website, the following content types have been created:

- **Lab:** representing the content type of online labs with the fields of name, lab logo image, lab subject, lab supportive language, and lab type (virtual lab, remote lab, or database);
- **Partner:** representing the content type of consortium partners with the fields of name, address, contact person, institute, and web links;
- **Workshop:** representing the content type of Go-Lab related workshops with the fields of starting and ending date, as well as workshop locations.
- **Publication:** representing the content type of related publications in books, journals, and conferences, with the fields of authors, title, year, publishing house, etc.
- **Deliverable:** representing the content type of Go-Lab deliverables (e.g. this document) with the fields of deliverable identifier for documentation, dates, title, etc. Figure 10 represents the author and user interfaces of a deliverable page.

Moreover, the display of each content type is flexible and consistent, since each field of a content type can be called and placed individually. For example, all partners have a unified display with a table of contact information and logo on the right side (see Figure 7: Project Partner page (UDEUSTO)).



**Figure 10: Deliverable type: author and user views**

Drupal allows developers to create views from individual nodes of content types. Views in Drupal are collections of nodes. A view can be a collection of selective nodes filtered and sorted by certain criteria. A view is dynamic content that can be changed according to the underlying static nodes. If the content of a single node is changed, the associated view will be adapted by the Drupal system accordingly. Thus, these views are optimal for an overview page for a group of similar web contents. The overview page of for the Go-Lab consortium partners is shown in Figure 11; the right part of the Figure 10 represents the overview page for the Deliverables.



**Figure 11: Overview page for the Go-Lab consortium partners**

## 4.3 Layout

Like other Content Management Systems, Drupal handles its layout and its content independently. The layout is specified by various themes in Drupal. Each theme consists of the basic look and feel of the web site, the color scalar, and even the detailed font styles.

### 4.3.1 Responsive/adaptive themes for website layout

With the fast development of mobile technologies, Android smartphones, iPhones, iPads and various Android pads have become important tools for website browsing. For the developers, it is challenging to make the same website content well readable on different screens. To address this, the Drupal developer community has developed a set of adaptive themes (AT) to fit website layouts on various screen sizes. A comprehensive Go-Lab project site theme has been created based on one of these adaptive themes.

According to the basic concept of the adaptive theme, Go-Lab Project Site theme applies grids for web layout design and categorises web layout styles in groups: standard screen, tablet landscape, tablet portrait, smartphone landscape, and smartphone portrait. It is recommended to place web elements with a grid of 60 px width. Figure 12 depicts these five categories with their resolution sizes in detail. The Go-Lab website layout places and shows the menu, navigation bars, and images in line with the width of the display. Accordingly, image width is also resized dynamically on standard screens like desktops and laptops.

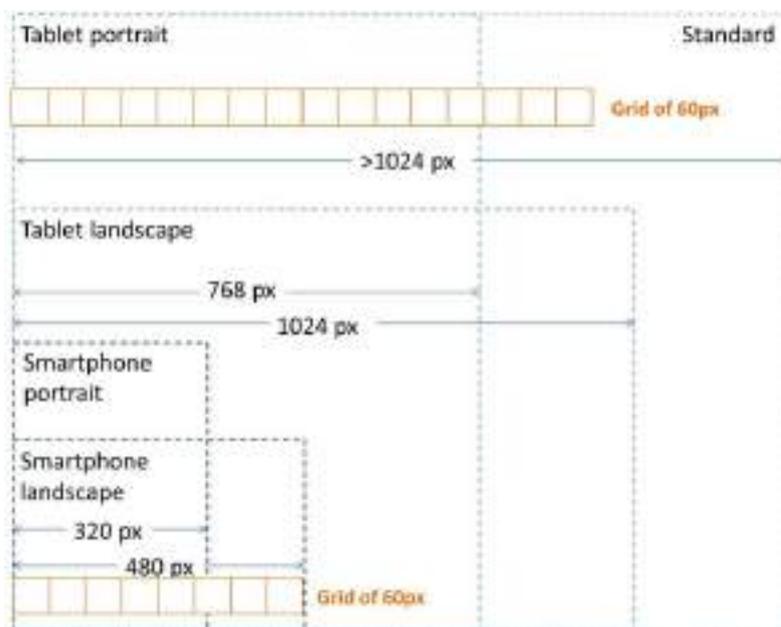


Figure 12: The screen size grids of responsive website design

### 4.3.2 Lessons learned

Since some Drupal adaptive themes are used, certain rules on how to place the web elements (such as menus and images) have been applied automatically. However, the graphic design (developed before the website implementation begins) has to be responsive to various screen displays as well. Certain solutions to scale up/down images are required (besides changing the positions of images on the screen). Thus, web site graphic designers need to think about the web layout with the grid concept, e.g. the grid of the width of 60 px, while developing the design. They need to consider the patterns to place web element in order to give the web site visitors a consistent visual look. During the web site implementation, fine tuning of the web pages in CSS is still indispensable.

## 5 Print Dissemination Materials

To support the offline promotion activities of the project, IMC (as the WP9 leader) creates print dissemination materials to be distributed by the consortium members among the external stakeholders.

*Standard dissemination materials* include:

- Go-Lab project leaflet containing general information about the project, outlining benefits for teachers, lab owners, and students as the main target groups, and describing selected showcases of online labs (Faulkes Telescopes and Hypatia Online Lab). (See Annex A).
- Go-Lab project business card, which is a small card providing project information in several bullet points and the link to the website. (See Annex C)
- Go-Lab roll-ups in two design variants that can be used to present the project on conferences and exhibitions. (See Annex D)

Additionally, *Workshop Flyer template* is provided to allow easy and fast creation of flyers promoting particular workshops organized by the project consortium members. This template contains several design variants for the cover side and a standard reverse side with a field to enter content. The content is contributed by the consortium partners and is quickly added to the flyer by IMC; after the flyer is finalized, it can be printed by the consortium partners. (See Annex B for sample flyers)

During the project time, further materials, such as target group specific leaflets containing information about the project and cooperation possibilities, as well as flyers for the Go-Lab Portal and showcases of online labs will be created. Dissemination materials can be made available in other languages on request of consortium partners. Currently, creation of project leaflets in Greek and Estonian languages is planned.

IMC will print a certain amount of standard dissemination materials (about 1.000 leaflets and business cards, as well as several roll-ups) and provide them to the consortium partners at the General Assembly or on request, if the materials are needed to an earlier date. However, the project partners will print the materials mostly themselves (as agreed with the project management) in order to avoid delays and additional shipping costs.

## 6 Conclusion

The Go-Lab Project created a project website, multiple social media groups and channels, as well as print materials to support Go-Lab promotional activities. During the project time, the website content and print materials will be extended following the development of the project and concentrating on those research areas and results that need to be represented to the project's target groups. This is a dynamic process requiring involvement and contribution of all consortium partners. The WP9 will coordinate online announcements and postings on the project website and blog, and create new print materials to support organisation of workshops and other events. Finally, all consortium partners will actively participate in project's social media activities being multipliers for the Go-Lab announcements.

Annex A: Standard Project Leaflet

Annex B: Sample Workshop Flyers

Annex C: Project Business Card

Annex D: Project Roll-Ups