

# Next-Lab

## Next Generation Stakeholders and Next Level Ecosystem for Collaborative Science Education with Online Labs

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## Specifications of the teacher-empowering facilities and activities

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## Executive Summary

The name of Next-Lab Work Package 2 sets the tone and expectations for all WP tasks: to empower teachers at different levels to create, implement and exploit inquiry learning spaces. A central goal in the Next-Lab project is to take the Go-Lab ecosystem to a next impact level by increasing the number of involved teachers and students. The preceding Go-Lab project has shown that training and support activities have great influence on the use and impact of Go-Lab in the classroom. Therefore, and in order to reach the set goals during the time of the Next-Lab project, the activities in this Work Package are aimed at expanding the training and support activities and facilities.

Section 2 provides an overview of our understanding and differences to the overall approach to training and support in the Next-Lab project. Without sufficient support and training, teachers will not be able to fully understand, appreciate and/or apply neither the concepts of Inquiry Based Science Education (IBSE), nor recognize the array of possibilities or opportunities of the various tools available as part of the Go-Lab system, ranging from online labs, teaching and learning apps, assessment tools, and the upcoming new functions and features. Consequently, the goals, objectives and planned work of WP2 will be described and outlined in this deliverable.

In order to coordinate the efforts to create training material, the idea for a Go-Lab Competence and Skills Framework will be described in section 3 to clearly link training content and material to the specific competencies and skills that teachers will need to create and implement high-quality ILSs.

Section 4 will present and describe the teacher-empowering activities foreseen. It defines the target groups that will be addressed and involved in the activities and describe briefly how the activities are aiming to advance the expertise progression in their Go-Lab Use Profiles. It furthers describes the plans and organisation for the training activities, both for international and national level. It concludes by describing the different the help-desk and support activities planned that will provide targeted and comprehensive (short and long-term) support to users of Go-Lab during teachers' working hours.

The Next-Lab teacher-empowering facilities aim to support teachers while working with the different platforms and services. The section 5 focuses on the technical features and tools that are or will be put in place to support and enable teachers to use Go-Lab in their teaching.

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## 1. Introduction

Competing in the global, knowledge-based economy and adjusting to the digital age are long-term challenges Europe must continue to address. Investing in human capital is the crucial aspects in meeting these challenges. High quality science education contributes to sustained economic growth, as well as sustainable development by fuelling R&D, innovation, productivity and competitiveness. According to the recent Scientix Report “Efforts to Increase Students’ Interest in Pursuing STEM Studies and Careers – National Measures Taken by 30 Countries” (Kearney, 2016) the majority of EU countries

- consider the introduction of inquiry based science education (IBSE) a current priority and have or are developing strategies to improve teaching and learning and the uptake of studies and careers in STEM area
- are paying more attention to improving the provision of professional development for in-service science and mathematics teachers than investing in science and mathematics specific initial teacher training.

There are no quick fixes in the world of education. Instead, education policy makers must support and commit to the laborious task of incrementally **improving the competences of the teachers** we train and the environment in which they teach, whilst providing teachers with a respect and trust commensurate according their critical societal roles.

**Teachers are the key players in the improvement and renewal of science education.**

Outstanding teaching activities are taking place in European science classrooms every day. But they are only taking place because of devoted, extraordinary teachers that go beyond conventional practices and that insist on implementing their vision of innovative STEM (school) education. These are teachers that are looking for innovative tools such as Go-Lab, and they are the ones that are looking for support to move over and above the official vocabulary-dense textbooks and encourage student inquiry-based thinking and participation.

Many studies, surveys and analyses support the idea that the critical evolution of the school system has to do with the changes related to the role of the teacher. On their study “How World’s Best-Performing School Systems Come Out On Top” McKinsey & Company (2007)<sup>1</sup> have studied the characteristics of top performing educational systems from the past decade and the lessons of their success, which are simple: **The only way to improve an educational system is to improve instruction**, and by doing so empower the teachers.

The name of Next-Lab Work Package 2 sets the tone and expectations for all WP tasks: **to empower teachers** at different levels to create, implement and exploit inquiry learning spaces. Without sufficient support and training, teachers will not be able to fully understand, appreciate and/or apply neither the concepts of Inquiry Based Science Education (IBSE), nor recognize the array of possibilities or opportunities of the various tools available as part of the Go-Lab ecosystem, ranging from online labs, teaching and learning apps, assessment tools, and the upcoming new functions and features.

Consequently, the goals, objectives and planned work of WP2 will be described and outlined in this deliverable. In order to coordinate the efforts to create training material, a Go-Lab Competence and Skills Framework will be developed to clearly link training content and material to the specific competencies and skills that teachers will need to create and

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<sup>1</sup> [http://mckinseysociety.com/downloads/reports/Education/Worlds\\_School\\_Systems\\_Final.pdf](http://mckinseysociety.com/downloads/reports/Education/Worlds_School_Systems_Final.pdf) (21 June 2017)

implement high-quality ILSs. Based on this framework, partners will be able to create and offer modular, tailor-made and targeted training, both online and offline, to enable users to acquire the skill set they need to become expert users of and in Go-Lab.

Experience in the previous project Go-Lab has shown that teachers produce Inquiry Learning Spaces (ILSs) of higher quality and are more comfortable using and implementing ILS in their classroom, if they have participated in at least one training activity and workshop while working with the Go-Lab services and platforms. Users are more confident and enthusiastic in using such infrastructures knowing that there is a support facility in place and that experts will provide guidance and answers in a short period of time. Additionally, given the different proficiency and experience levels of the users, we have also identified the need for a long-term support mechanism for the tools and services of the ecosystem as well as on pedagogical aspects.

In order to empower our teachers and boost the use of our tools and services from teachers both in terms of designing high end Inquiry Learning Spaces (ILSs) as well as in-class use, the project team aims to put in place a sustainable set of support facilities for teachers and design a set of activities to facilitate their in-depth training. More particularly, the project team has already set in place the use of a dedicated help-desk facility while at the same time a tutoring and mentoring scheme is also in place and ready to be used.

We present the specifications for the teacher-empowering facilities and activities of Next-Lab. By offering to Go-Lab users new empowering tools, services and features, immediate feedback and enhanced training opportunities, we hope to achieve an increase in the overall use of the ecosystem. Teachers and users will appreciate that there is an expert project team from all over Europe that aims to support and facilitate them in their efforts to create and implement Inquiry Learning Spaces (ILSs), without having to wait and postpone their work because of delayed answers.

## 2. The Next-Lab Approach to Support & Training

Many of the training & support activities of the preceding Go-Lab project focused on introducing teachers to the foundational concepts of IBSE as well as in the use of the Go-Lab ecosystem and creation of ILSs. Teachers were informed about the potential of using remote, virtual and online labs in their classroom, encouraged to take part in the conceptual development of the Go-Lab services and platforms, trained in the design, creation and implementation of ILSs and how to navigate between different Go-Lab platforms, i.e. Golabz and the authoring platform Graasp. All activities were embedded in the overall effort to create a strong and sustainable user community, that will contribute to building a broad teacher-generated and user-accepted database of inquiry learning spaces and to promote the use of the ecosystem.

While fostering the Go-Lab user community (especially in WP1) and expanding the Golabz portfolio of published apps, labs and ILSs is still an important aspect of the activities of WP2 in Next-Lab, the main effort of the specific training activities of task 2.3 and 2.4 as well as the facilities to be developed in tasks 2.1, 2.2 and 2.5 have been designed to follow a different approach and serve a slightly different purpose: The key focus shifts away from the overall goal of ILS creation and community building, towards providing and enabling more specific expertise in regards to the specific concepts, use and implementation of high-quality inquiry-based science education when using Go-Lab tools, and enabling greater multiplying impact among partners and key teachers (especially Go-Lab Ambassadors and Next-Lab Expert Teachers). Accordingly, the goals and objectives of the training activities in Next-lab are expanding on the one hand, but at the same time are becoming more focused and user- and needs-specific. In the Next-Lab project the teacher empowering facilities & activities aim to:

- expand its outreach and include new target groups, such as primary teachers and pre-service teachers whose training needs and competence level will differ;
- develop new functions and features for personalised learning and teaching that supports the inclusion of badges and recognition tools;
- establish a modular approach, allowing for greater flexibility in the workshop and training design and implementation, both on international and national level;
- provide more tailor-made and more targeted training material that distinguishes even more between the different target & user groups, skill and training needs and their respective proficiency levels;
- offer a broader range of training subjects and topics that will provide deeper knowledge and understanding of all relevant domains, skills and competencies needed to use and implement the Go-Lab ecosystem in STEM school education;
- enable each National Expertise Centre (NEC) and Ambassador to use and adapt the core workshop material for their own national training workshops and activities;
- qualify more teachers to become Next-Lab Expert Teachers that will also act as multipliers and ambassadors of the Go-Lab ecosystem and encourage the update and use of the services among their peers and colleagues at local, regional and national communities;
- provide transparent, accessible and adaptable training content so that all NECs, ambassadors and Next-Lab Expert Teachers can create and conduct their own training activities, workshops, online training, webinars, etc.;

- enable and encourage more multiplication and peer-to-peer activities (i.e. peer-training, mentoring, coaching, help-desk support, etc.) by building on its established Go-Lab teacher community with the goal to maximize the multiplying impact of the teachers involved in training activities;
- be coordinated (and reported) centrally, but implemented locally;

However, these ambitious goals necessitate a solid and carefully designed fundament to build upon and to provide guidance for the proper production and delivery of training material and workshops, ensuring that all activities are in line with the overall goals, objectives and skill needs. To safeguard the successful accomplished achievement of the aims listed above and to ensure the most appropriate and effective training form, types and content, it is essential to develop a common understanding of the competencies and skills set that an ideal profile of the Go-Lab teachers should attain, i.e. an all-encompassing competence & skill framework specifically for the use of the Go-Lab ecosystem.

Such a framework will allow us analyse, understand and categorize the teachers' competences, specific skills and competencies that are needed to facilitate the "Teacher Journey" as described in Deliverable D1.1n (section 6.3) that outlines the different phase of use of the Go-Lab ecosystem and Go-Lab user profiles, starting from being a visitor, member, user, creator to eventually becoming an implementer and publisher of ILSs (see also section 4.1.2 below). In order to provide custom-made training that facilitates the progress in this journey, it is essential to describe for each proficiency level the knowledge, competency and skill needed in order for the users to use and implement (existing ILSs) in their classroom, draft and create (new ILSs) and publish best-practice ILSs on Golabz.

However, creating a competence framework needs careful investigation, examination and discussion with the relevant experts in each field and domain. In this document, we therefore present the outline, structure and suggest a first breakdown of the envisaged Go-Lab competence & skill framework. During the upcoming months and project phases, the partners in WP2 will continue to revise, update, enhance and complete the framework, relying on the discussion and feedback from within the consortium, but also in cooperation and collaboration with the teachers and trainees in the frame of participatory design activities.

To achieve the goals defined above, the form and the content of the training courses will be designed together with the teachers, taking into account their needs, constraints and expectations. A formal process is being put in place to select the locations and the organizers of these events, as well as a careful selection of the participants to maximize impact (see section 4.2.2 International Training Events for the description of these processes).

### 3. The Go-Lab Competence & Skill Framework

According to the OECD (Pedagogical Knowledge and the Changing Nature of the Teaching Profession, 2017)<sup>2</sup>, competence frameworks should have four basic aims:

1. establishing standards (common references) of knowledge, skills, and wider competences and competencies;
2. promoting quality of education and training provision;
3. coordinating and comparing qualifications by relating them to each other;
4. promoting access to learning, transfer of learning and progression in learning.

The envisaged Go-Lab competence & skill framework is addressing (to various degrees) all four of the above points: 1) it is establishing the definitions and standards for the main user groups and describes the skills and competencies needed for each phase. 2) It will help us produce more targeted training, ensuring that all competency and skill levels are covered in at least one training form. 3) It will allow us to implement the planned qualification system ( e.g., badges) to award teachers and users with the recognition they deserve when having accomplished an expertise level. 4) It will help teachers to understand their weaknesses and skill needs in the use of Go-Lab and thus promote progression.

It will identify and document the fundamental skills and abilities required for conceptualizing, creating, drafting and implementing inquiry based learning activities in science classrooms for (science) teachers in primary and secondary schools, or for individuals interested in designing and preparing such activities. It will:

- provide a common set of expectations for what teachers and user should achieve in any training workshop, course or program (or on their own) for the creation of IBSE based ILSs in Graasp using Golabz labs and applications;
- provide a foundation for developing a relevant, focused, and engaging training program and Go-Lab curriculum for primary and secondary STEM education at European level;

The Go-Lab Competence & Skill Framework describes, defines and helps us to better organize the content of Go-Lab training, but is not the curriculum itself. Rather, the framework provides the guidelines for developing curriculum and instructional content for the workshops and courses.

However, Next-Lab partners will be able to align and adjust their training material and workshops that altogether will form the Go-Lab Curriculum. The goal is to develop more focused training material to improve the relevance and outcomes of teacher training, taking into consideration a wide variety of learning material, types of training delivery and workshops, (online) courses and instructional delivery models. It will provide the specific details on how courses and workshops must be organized in order to achieve a higher or now proficiency level of the participants.

In this way, the Go-Lab Competence & Skill Framework provides an important reference for training providers, but also teachers, schools, and teacher training institutes on what teachers should know and be able to do (in our case in regards to the use and implementation of Go-Lab – see the “Teacher Journey” D1.1, section 6.3). Ultimately, the Go-Lab Competence & Skill Framework needs to describe what learners should know and

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<sup>2</sup> Guerriero, S.(ed.) (2017), Pedagogical Knowledge and the Changing Nature of the Teaching Profession, OECD Publishing, Paris.DOI: <http://dx.doi.org/10.1787/9789264270695-en>

be able to do to become Go-Lab Expert Teachers and multipliers. It can serve as a control mechanism of existing and future material to see to what extent the training implemented has been adequately designed to address the skills needs.

Go-Lab teachers will understand and realize more easily what is expected from them and how they can improve their skill level at different stages of their teaching careers. It will help them to understand what their deficits are and what training in which domain or skill level is needed for them individually. Teachers will become aware of their specific knowledge and skill gap and be able to better analyse the weaknesses in their own teaching practice. In the end, this could support the sustainability of the project and the Go-Lab ecosystem, if the consortium agrees that non-Next-Lab partner training providers could use the framework to offer specific Go-Lab training for formal and informal teacher training.

### **3.1 The Go-Lab Competence & Skill Framework / Domains**

A Competence & Skill Framework needs to focus on the essential competencies and skills required for a particular subject, domains, tool and/or discipline; in our case, for individual teachers (or teams) to create and implement innovative and engaging inquiry learning spaces (ILS). The ability to understand inquiry based science educational concepts, correctly applying the phases of inquiry in a lesson plan, integrating the right apps and labs into ILS using the Graasp authoring platform, understanding and applying the skill assessment tools for teachers, and most effectively applying the science knowledge in an ILS are essential skills for all teachers in order to create meaningful and successful ILSs.

However, as an example, to create an ILS for students in upper secondary school education for physics subjects requires usually a significantly more complex and challenging inquiry learning space than a lesson plan and ILS for primary and lower secondary school classes. With the increasing complexity of an ILS, teachers would need to be more aware of the existence and difficulty in the use and application of Go-Lab skills and tools, and not only in the scientific knowledge of the subject area. Thus, the overall Go-Lab Competence & Skill Framework needs to encompass skills across a variety of domains and areas in what is a broad, cross-functional, creative task.

We propose to organize the Go-Lab Competence & Skill Framework in four **Domains**, each of which can be broken down in various **Competencies** which themselves are further broken down in **knowledge** and **Skills** with specific definitions. This structure and skills definition establishes and clarifies the overall context, knowledge, skills and abilities to successfully conclude the “Teacher Journey” and to become an Expert Next-Lab teacher.

The Go-Lab Competence & Skill Framework Domains for successfully using, implementing and multiplying Go-Lab are:

#### **Domain 1: Pedagogy / Inquiry Based Science Education (IBSE)**

Inquiry-based science education (IBSE) is an inspiring way of teaching STEM subjects as it focuses on students’ interests and inspires active learning by enabling students to implement their own investigations and experiments. This domain focuses on the teachers’ understanding of IBSE and related pedagogical strategies ( e.g., project-based-learning (PBL)), their design, the development of coherent lesson plans and the knowledge required to translate this concept into Go-Lab. The pedagogy domain provides the overall context for the use of the Go-Lab system and guarantees that the teacher fully understands the most important theory background for all aspects of the ILS design and creation process.

## Domain 2: Use of the Go-Lab Ecosystem

Go-Lab offers science teachers an opportunity to create highly interactive and personalised inquiry learning experiences for their students. It offers a broad set of remote and virtual laboratories that form an integral part of the ILSs. The Go-Lab Authoring Platform (graasp.eu) offers multiple facilities to create in a personalised ILSs from an online lab or to re-use and adapt ILSs that were created before by other teachers. It allows the inclusion of apps, small web based software applications supporting specific learning or teaching goals and tasks. This specific Domain provides the knowledge regarding the technical functions of the Go-Lab Platforms, its tools, widgets and apps for learning and learning assessment.

## Domain 3: 21<sup>st</sup> century skills / Learning Assessment in Go-Lab

Within the Next-Lab project a set of integrated apps for the Go-Lab ecosystem helping students to acquire 21<sup>st</sup> century, “learning and innovation” skills, allowing to combine technical solutions with societal challenges will be developed. Effective cultivation of 21<sup>st</sup> century skills also involves offline instructional dialogues based on a deliberate diagnosis of students’ abilities. These are additional, new challenges for teachers as they need to learn how students’ skills need to be monitored (diagnosis) so that they can carefully adjust their classroom interventions to students’ current level of 21<sup>st</sup> century skills competencies, and reduce their support as students come to master thinking skills and social competencies. The Learning Assessment Domain provides therefore the context to introduce teachers in the field of learning analytics & assessment as well as 21<sup>st</sup> century skills. In Next-Lab teachers will need training to apply the various apps that will help them to train and (peer-) assess students in 21<sup>st</sup> century skills.

## Domain 4: Multiplication / Communication

The community building and dissemination of information about Go-Lab to teachers and their peers - science and mathematics teachers in their respective countries - is a central task in the efforts to extend the project’s outreach and coverage throughout Europe. Next-Lab Ambassadors and Expert teachers will have to task to support the NECs to present Go-Lab in schools and national teachers’ associations, on conferences and organize their own workshops. They will need to support & advise teachers how to get involved and use Go-Lab in their teaching. However, not all teachers with expertise in the use Go-Lab and ILS creation and classroom implementation, have sufficient skills in being effective multiplier to their local communities. The Domain Multiplication / Communication provides the knowledge regarding workshop organization, community building, communication, dissemination and use of social media tools.

### 3.1.1 Defining Competencies & Skills

The level under each Go-Lab Domain are the specific foundational competencies that describe the skill sets that a Go-Lab Expert teacher needs to progress in the Teacher Journey and in order to design, develop and deploy interactive ILSs.

The tasks in the coming months will be to define, complete and describe for each of the Domains the competencies and skills. Using as example the Domain 1: Pedagogy / IBSE, the following competencies / knowledge areas could be attributed to this pedagogical domain:

- Competency 1: The Scientific Inquiry Process – Basic Principles
- Competency 2: Strategies integration IBSE / Go-Lab in the school curriculum
- Competency 3: Exploiting online labs at school

- Competency 4: IBSE specific lesson design
- Competency 5: Student-centred instructional strategies
- Competency 6: IBSE levels / strategies / models
- Competency 7: Multidisciplinary Teaching / Big Ideas of Science
- Competency 8: Co-creation and sharing of open educational resources (ILS)
- Competency 9: Integration of other pedagogic approaches in Go-Lab
- Competency 10: Classroom Management / Go-Lab as motivational factor

Each competency will then be further broken down in hierarchical skills or knowledge that address all proficiency levels of the Next-Lab target groups. As example, competency 1&2:

Competency 1: The Scientific Inquiry Process – Basic Principles

- 1.1. Can identify the basic model and steps of the scientific inquiry process
- 1.2. Can explain the concept and meaning of scientific inquiry process
- 1.3. Can discuss the relevance for each step of the scientific inquiry process
- 1.4. Can train and educate peers in the concept and process of scientific inquiry

Competency 2: Inquiry Based Science Education – Basic Principles

- 2.1. Can identify the basic model of using IBSE as educational strategy
- 2.2. Can explain the concept and meaning of IBSE
- 2.3. Can discuss the advantages and challenges of IBSE
- 2.4. Can train and educate peers in the overall concept of IBSE

We propose then to define the proficiency level for each skill and link it to a specific existing or to be produced training content.

## Example of the Go-Lab Competence & Skill Framework

### Abbreviation Key:

HB = Handbook / Guidelines

VT = Video Tutorials

TT = Tips and Tricks

MOOC = Massive Open Online Course

WS = Stand-alone Workshop

SS = Summer School

Black Font = already existing (Go-Lab project)

Red Font = to be introduced (in Next-Lab)

Domain 1: Pedagogy / IBSE								
Competency 1: The Scientific Inquiry Process – Basic Principles				Proficiency Level			Go-Lab Training Delivery	
Skill	Description	Beginner	Interm.	Expert	Self-study	Face-2-Face	Online	
1.1	Can identify the basic model and steps of the scientific inquiry process				HB	WS	MOOC	
1.2	Can explain the concept and meaning of scientific inquiry process				TT, HB	WS	MOOC	
1.3	Can discuss the relevance for each step of the scientific inquiry process				TT, JB	WS		
1.4	Can train and educate others in the concept and process of scientific inquiry					SS,WS		

Competency 2: IBSE levels / strategies / models				Proficiency Level			Training Delivery		
Skill	Description	Beginner	Interm.	Expert	Self-study	Face-2-Face	Online		
2.1	Can identify the basic model of using IBSE as educational strategy								
2.2	Can explain the concept and meaning of IBSE								
2.3	Can discuss the advantages and challenges of IBSE								
2.4	Can train and educate peers in the overall concept of IBSE								

## 4. Teacher-empowering Activities

A central goal in the Next-Lab project is to take the Go-Lab ecosystem to a next impact level by increasing the number of involved teachers and students. The preceding Go-Lab project has shown that training and support activities have great influence on the use and impact of Go-Lab in the classroom. Therefore, and in order to reach the set goals during the time of the Next-Lab project, the activities in this Work Package are aimed at expanding the training and support activities and facilities.

The upcoming section will present and describe the teacher-empowering activities foreseen in WP2. In this framework, “teacher-empowering activities” are understood as all tasks that foresee and require **direct interaction and communication** from the project team with teachers and users. This section will define the target groups that will be addressed and involved in the activities and describe briefly how the activities are aiming to advance the expertise progression in the teacher journey already described in D1.1. Then, it will present the plans and organisation for the training activities, both for international and national level. Section 4 will conclude by describing the different the help-desk and support activities planned that will provide targeted and comprehensive (short and long-term) support to users of Go-Lab during teachers’ working hours.

The section 5 (“Teacher-empowering facilities”) will focus on the **technical features and tools** that will be put in place to support and enable teachers to use Go-Lab in their teaching, but where direct interaction and communication is not the focus of the activity.

### 4.1 Next-Lab Target Groups, Go-Lab User Profiles and Proficiency Levels

#### 4.1.1 Main target group of teacher-empowering activities

The Go-Lab ecosystem was primarily designed for the use by science / STEM teachers. Therefore, the main target groups of Next-Lab training activities are **in-service and pre-service teachers in primary and secondary school education** from all over Europe, given that these are teachers that most likely will implement Go-Lab ILSs in their (future) classrooms.

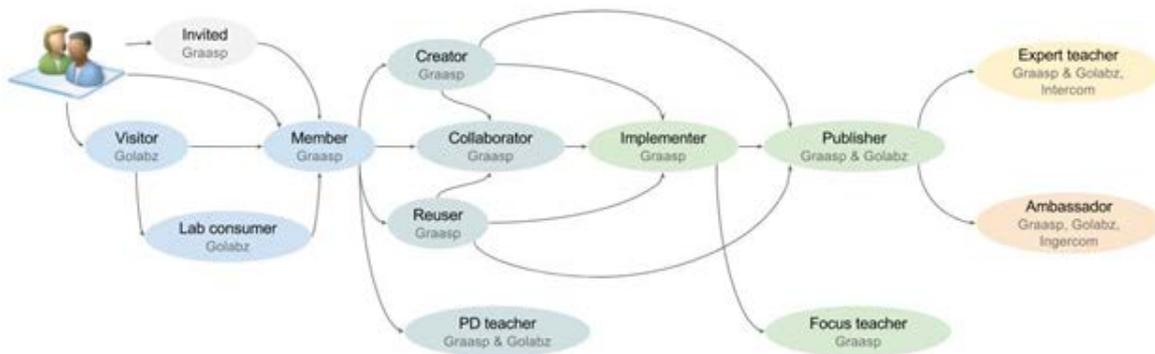
One of the major challenges to overcome are the differences in the skill and training needs regarding the use and implementation of the Go-Lab ecosystem among the teacher groups on European level, but also on national level. The training needs will change depending on the years of service, education, participation in (other) continuous professional development activities, country, curricular issues, school environment, interest & motivation, previous involvement in the Go-Lab project, familiarity with the use of ICT tools in schools, etc. - to name just a few of the factors.

Consequently, and for the purpose of preparing teachers for the use of Go-Lab it is more practical to distinguish the target groups not by their teaching profile (subject / primary / secondary education – in-service / pre-service), but by their user profiles and proficiency level regarding the competencies and skills needed for the use of Go-Lab.

#### 4.1.2 Go-Lab user profiles

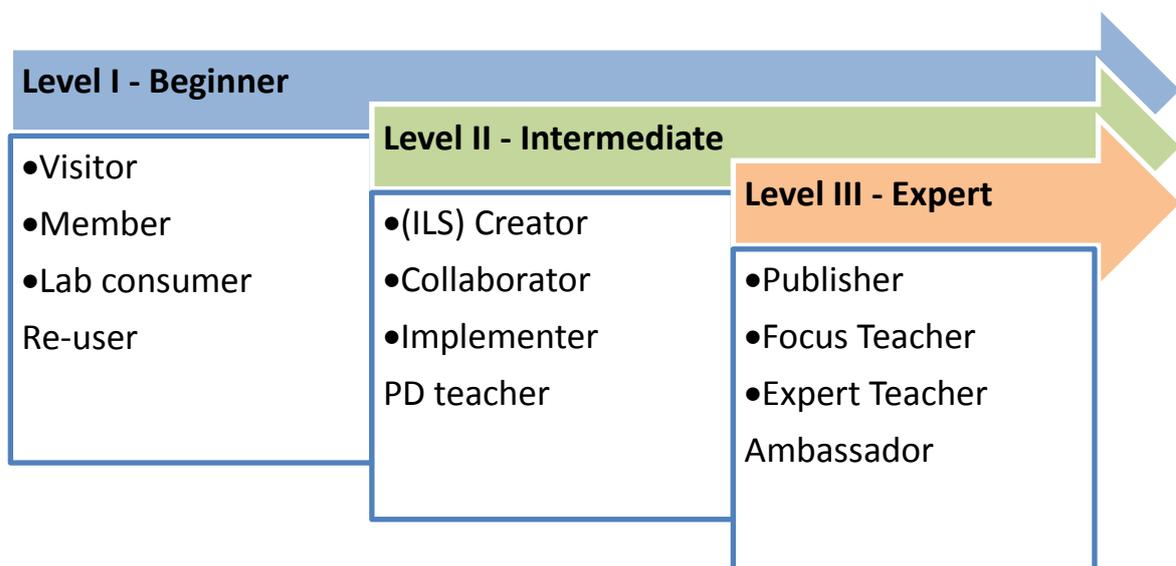
As outlined in D1.1, the “model Go-Lab teacher” will embark on a journey that ideally will result into becoming an expert in all domains of the Go-Lab ecosystem. At the end of the journey, supported by training and support mechanism put in place and detailed in this

document, the teacher would be able to mentor, tutor and train his/her peers in convince others to update the use and integration of Go-Lab in their classrooms.



**Figure 1. “Teacher Journey” and Go-Lab User Profiles (as described in D1.1).**

But teachers will start and remain at different user profiles if not directly supported or trained. The key goal and objective of all training activities will therefore be to facilitate the progression of this teacher journey through the various user profiles and proficiency levels for as many teachers as possible on national and international level. The proficiency levels of the Go-Lab user profiles can be grouped in three main clusters:



**Figure 2. Proficiency Levels of Go-Lab teachers and the user profiles.**

Training will thus have to be organized in such a way that each activity will help and support the trainees to advance in any given topic of any of the four main Go-Lab competence domains. The Go-Lab Competence Framework as described above will eventually define and detail the exact skills per proficiency level and user profile so that the training material can be adjusted to serve this teacher Go-Lab competence development.

## **4.2 The Next-Lab Training Activities**

The training in Next-Lab will consist of a mix of face-to-face and online training activities addressing the needs of pre- and in-service teachers in primary and secondary school education, both on national and international level.

At a national level, these activities will be organized by the NECs and the Go-Lab Ambassadors selected and trained under WP1. To facilitate the training, all workshop materials, training courses and instructions created throughout the duration of Next-Lab will be structured in following a modular principle and centrally collected. They will be accessible by all who wish to deliver a training on any of the subjects.

The modular approach of the training will allow greatest possible flexibility for the NEC and ambassador to design and run their workshop according to the local needs of the teachers and trainees and taking into account local or national peculiarities. This approach will help to ensure that all teachers receive tailor-made training on the use of Next-Lab for science education based on their skills needs, as well as other factors such as their local curriculum and school organization. Even more, once the competence framework is finalized, all teacher training courses and workshops can be planned to address the different proficiency levels as described in the Competence Framework and the user profiles of the “Teacher Journey” of D1.1.

The training on international level will be organized centrally with support and contributions by all partners of task 2.4, and implemented in courses of several days’ duration (depending on the scope and target groups the most likely duration of these courses 3-6 days). Each of the Summer / Winter Schools will have a specific theme and/or be addressed to a specific target group. The theme, location and date will be decided on project consortium level.

### **4.2.1 Training course development / Workshop Structure / Modular design**

The course development will take into account the four Go-Lab competence domains (Pedagogy / IBSE; Go-Lab Ecosystem; 21<sup>st</sup> Century Skills and Learning Assessment; Multiplication / Communication). A training workshop can thus be quickly adjusted depending on the proficiency level of the trainees or for the key target groups of the training: in-service and pre-service teachers in both primary and secondary education.

The training courses and content will be developed in such a way that every NEC and/or Next-Lab ambassador – independently of their expertise and background (ICT, teacher training, etc.) will be able to conduct training and workshops for Go-Lab users in all expertise level for all Next-Lab / Go-Lab relates issues and topics. To safeguard the principle it is necessary that

- a. all workshop material and information is accessible. For this a space on Graasp has been created to which partners can upload their presentations, material, supporting documents, etc.: <http://graasp.eu/spaces/58ff24c21e0ddb47893bcf86>
- b. clear guidelines and instructions are available, e.g., how to run and structure the workshop related to any given topic.

#### **4.2.1.1 The Model Training Workshop Structure**

Part experience has shown that teachers appreciate more and profit most from hands-on activities rather than lectures. Teachers attending Go-Lab workshops typically come with the expectation to learn practical tips that will help them create more interesting science lessons, support their ILS design or learn about the newest developments, labs, apps and other functions. Consequently, the core of each workshop should consist of hands-on

activities. Depending on the subjects, a hands-on activity can be an activity using the Go-Lab platform or an activity that uses other materials. It may not even need computers.

Each workshop should conclude with a wrap-up part to summarize what was learned, the connection to the Go-Lab ecosystem and/or to the project's main objectives (for example promoting 21st century skills). The wrap-up activity could be a conversation, a questionnaire, taking a vote, etc.

Therefore - and ideally -, a model Go-Lab training workshop has three main parts:

- a. an introduction and core presentation or demonstration (max. 30 min), followed by
- b. hands-on and minds-on activity (30-90 min), and
- c. a wrap-up activity / period of reflection and feedback (15-30 min).

Each workshop needs to be accompanied by a brief description and trainers instructions for each of the parts, so that a trainer / tutor is able to implement the workshops and knows what she/he is expected to do. Information about the structure, process, and time-plan of the session, as well as what to watch out for and to prepare all the necessary materials that the trainer should use will be provided in a "Next-Lab Face-to-Face Training Workshop Instructions" document (see **Annex 2**). This document will cover areas such as:

- Workshop title:
- Estimated total workshop duration:
- Requirements
- Minimum/maximum number of participants:
- Special infrastructure needed:
- Workshop structure and organization
- Rational and objectives
- Learning goals and content to be covered
- Workshop activities description

#### **4.2.1.2 The Next-Lab training course for the Next-Lab Summer School 2017**

For the first year, the breakdown per Go-Lab competence domain and workshop has been agreed among partners. The tables in Annex 3 give an overview about the workshops to be created (to be implemented firstly at the Next-Lab Summer School 2017), as well as their connection to the other tasks in Next-Lab and the responsible partner for the development.

### **4.2.2 International Training Events**

#### **4.2.2.1 Purpose / duration / location**

The analysis of similar training activities during the previous Go-Lab project showed, that there was a strong correlation between course participation and the creation & implementation of ILSs in classrooms. More generally, face-2-face workshops have proven to be more effective than other support activities. The Next-Lab project will this invite science teachers interested or experienced in using the Go-Lab ecosystem to international training events, where they can exchange experience and bring their Go-Lab skills to a new, advanced level. They are an exceptional opportunity to train teachers in selected aspects of the Go-Lab ecosystem. Moreover, summer and winter schools provide a good instance for the project to intensively interact with (specific) teachers or teacher groups to meet, exchange experiences, test new features, conduct participatory design activities and more generally have common place of learning and teaching.

During the project's duration, at least 3 Summer Schools and 2-3 Winter Schools are foreseen to take place. Each course will focus on a specific theme, competence domain or

target group. The theme will be proposed by the course organizer and be agreed with at consortium level. The summer schools are expected to last at least 5 days, while winter schools may take the form of intensive 3-day workshops taking place over a weekend, to enable the participation of in-service teachers even during the school year.

The place and organization will also be decided in the GA meeting, and it is desired to offer courses in different locations (i.e. 1<sup>st</sup> summer school is decided to take place in Marathon, Greece; 2<sup>nd</sup> summer school in 2018 either in Portugal or Estonia; location 3<sup>rd</sup> summer school 2019 still open). Each Next-Lab partner is invited to act as host.

#### 4.2.2.2 Themes and topics

Each summer and winter school will have a specific theme. The theme, focus and target groups addressed will be decided for each of the 5-6 planned events separately on WP and GA level. This will also determine the dates, location, and/or duration of each course which may vary between 3-6 days, depending on the time, place, target groups availability.

The Next-Lab Summer School 2017 is designed for experienced Go-Lab practitioners, eager to improve and develop their skills and competences in the use of the Go-Lab ecosystem. The programme and course will focus on enabling experienced users to become Go-Lab Expert Teachers (as defined in D1.1) by training them in the more advanced tools, features and tools of Go-Lab. Overall, the workshops will focus on the optimum use of online virtual experimentations and remote laboratories as well as on deepening the knowledge on inquiry-based and interdisciplinary science teaching techniques of attendees, in order for them to further develop, improve and enhance their teaching skills and practices.

The themes and topics for the workshops of the upcoming winter or summer schools have not been decided yet. Indicatively, the following dates, locations and main themes are being discussed:

Theme	Type	(Indicative) Date	(Indicative) Location	Main Target group
Effectively introducing and supporting peers / teachers in using Go-Lab	Winter School (3-day)	November 2017	Brussels, Belgium	Next-Lab Ambassadors
Using Go-Lab in pre-service training	Winter School (3-day)	March 2018	TBD	Pre-service teachers Teacher training institutes
The use and application of the Go-Lab ecosystem in primary schools	Summer School (6-day)	July 2018	Madeira, Portugal	Primary school teachers
Co-creating ILS (for primary education)	Winter School (3-day)	November 2018	TBD	Primary school teachers

Co-creating ILS (for secondary education)	Winter School (3-day)	March 2019	TBD	Secondary school teachers
TBD	Summer School (6-day)	June 2019	TBD	TBD

#### 4.2.2.3 Selection of participants

The careful selection of participants is an important aspect for the success of each training course on various levels.

- The teachers are investing in many cases their vacation time to attend the course.
- The project is investing significant resources to bring 20-30 teachers and participants from all over Europe together in one place.
- The partners are investing substantial resources in developing training course for the defined target group.

Therefore, and depending on the focus and target of the course, the selections of course participants needs to take into account that the course must be a beneficial experience for all involved. The teachers should individually benefit from the training activities in order to have long-lasting impact on the Go-Lab ecosystem use and classroom implementation. The project partners will take into account the feedback of the participants for improving the activities and facilities when in line with the project objectives and with the project resources.

Additionally, the participation and experience of being together with motivated teachers from all over Europe should also be understood as an award for and to outstanding and deserving Go-Lab users that have excelled in their support to colleagues and peers to update Go-Lab, use and implementation of Go-Lab in their classrooms and contributions made to the project and Go-Lab design.

In principle, for each training event a formal, competitive, and motivating scheme will be established and implemented that will define who is being awarded with a scholarship to enable their participation to these face-to-face networking and training events. However, in case of courses dedicated for a specific target group ( e.g., Next-Lab Ambassadors), such process may be skipped and participants will be directly selected. The number of participants per training event is to be decided for each event separately and is subject to the funding available. As a general rule, an effective course should have between 20-30 participants.

The application and selection procedure will be adapted to the needs of each course. For the 2017 Summer School an application procedure was introduced. Teachers had to demonstrate their advanced experience in the creation of ILS, participation in Go-Lab activities and plans for sharing their knowledge about Go-Lab by supporting colleagues in their region. The application form is re-produced in Annex 1.

The selection committee consists of the task leader of the training tasks 2.4 (EA), the two partners most involved in planning and implementing of training courses on international level (NUCLIO, EUN) as well as the project coordinator who provides the funding for the events (UT).

### **4.2.3 National Training Activities**

While the international training activities are centrally organized and follow an overall thematic concept and goal, the activities on local level are being independently organized by each Next-Lab Expertise Centre (NEC). The list of NEC, their roles and responsibilities are detailed in D1.1.

NECs are the key drivers in the overall training provision in Next-Lab and are forming the kernel of the project's impact ensuring strategy. NECs should organize their training workshops according to identified needs on local level. Generally, they should address all user profile and target groups by:

- Regularly organizing local workshops for new teachers who are interested in using the Go-Lab ecosystem in their teaching;
- Offering workshops custom-made to their audience to cover each of the competency domains as described above and using the material commonly created and shared;
- Providing training on the latest updates, features and relevant information regarding the Go-Lab ecosystem for the teachers, schools, and teacher trainers in their country.

The types of workshops can be both onsite / face-2-face or online based, and can be implemented in their local language. Each NEC is expected to offer at least 2 onsite / face-2-face workshops per year and produce at least one online seminar / video tutorial per year.

### **4.3 Help-desk and Support Activities**

The training activities are designed to achieve a long-term, sustainable impact on the teachers' skills and competences. They serve to help teachers advance and progress in their "journey" through the various Go-Lab User Profiles as described above.

In Next-Lab we aim to also introduce other forms of help and support, by offering a new function that allows to give immediate response to any kind of question a Go-Lab user may have. In the previous months, we tested different Help-desk services ( e.g., technical help, pedagogical help) that offers quick solutions for problems that users are facing while using the ecosystem. The services, platforms and infrastructure used is presented in the section 5.2 (Help-desk facilities) below. The upcoming section will describe the goals of the activities that are planned to be offered through the facility. Firstly, we will describe the Go-Lab Help-desk as first line of support for Go-Lab users. This is followed by a description to expand the service of the help-desk to enable and allow for coaching and mentoring type of activities that would go beyond the immediate (technical) problem-solving.

#### **4.3.1 The Go-Lab Help-desk - First Line of Support for Teachers**

As mentioned in the description of action (page 16 of Annex 1) the Go-Lab Help-desk is a service that aims to allow direct online contact between teachers and the support team, providing thus support on demand at times that teachers are developing as well as using and implementing ILSs in their classrooms. Based on our experience from the Go-Lab project - and based on the Next-Lab project's recent participatory design activities about Next-Lab support and help services (done in WP4 in collaboration with WP2 and presented in detail in D4.1 "Report on participatory design activities and adoption" deliverable) in which 65 teachers have participated, live and direct contact and discussion with a team member is at the top of the teachers "wish list". Contacting a Go-Lab team member via e-mail is in second place as 74% of teachers are contacting experts through this service. In addition, 50-60% of the teachers mentioned that they would like to have access to the Go-Lab team

via instant chat. One aim of our Go-Lab Help-desk is to merge these services and allow a hybrid solution through which teachers can instantly ask the team a question as they would do via an e-mail while also having the option to have an instant chat with a member of the team.

The Go-Lab Help-desk therefore aims to offer ad-hoc help and solutions whenever users experience problems that are taking place at that instant. The ultimate objective of the Go-Lab Help-desk is to offer first contact solution as often and as quickly as possible. Any time one of the Go-Lab teachers or users is experiencing problems with the Go-Lab ecosystem (Golabz / Graasp) the Go-Lab Help-desk is the first option to answer or fix the problem in order to enable the teachers to continue their design or implementation as quickly as possible. It is foreseen that National Expertise Centres (NECs) and Go-Lab Ambassadors will be able to offer immediate help to teachers during the working hours.

The Go-Lab Help-desk is meant to provide design and implementation support. The Go-Lab Help-desk (and the software solution used) offers a **single point of contact** for all questions in the use of Go-Lab, be it technical (Graasp usage problems with apps or labs, etc.) or pedagogical (questions about Inquiry Based Science Education, etc.). The Go-Lab Help-desk aims to establish an ongoing discussion with the user until the problem or issue has been clarified and a satisfying answer has been given. Having this single point of contact has several advantages, as it will:

- Ensure (and increase) user satisfaction - users will get quick responses to their query;
- Provide for better accessibility – Go-Lab users will have a direct contact with the Go-Lab team and can establish rapport with the team behind the project;
- Increase the Go-Lab users' productivity - the service is tackling and tracking the identified problem, enabling the teacher to continue with their work and for the team member to identify areas of improvements;
- Monitors all problems, processes and trends – it will allow for adjustments to fix the problem and indicate to the Go-Lab team what activities or facilities should be adapted;
- Improve the Go-Lab ecosystem – the service will improve the responsiveness of Go-Lab as reported problems can be reported and fixed in a shorter period of time.

The team behind the Go-Lab Help-desk is mainly comprised of NECs but Go-Lab Ambassadors will also be involved in order to cover the demands and to be able to cover questions in as many European countries and languages as possible.

### 4.3.2 Coaching and Mentoring

The idea of the coaching and mentoring scheme is to deliver to teachers an even more dedicated and long-term support than the ad-hoc help-desk. The activities in this scheme would be focusing mostly on supporting the creation of high quality ILSs as well as on supporting teachers' collaboration while creating ILSs. Teachers will interact with coaches that will guide them to create high quality ILSs starting from adapting selected ILSs ( e.g., designed in Task 2.5) or starting from scratch once they feel confident enough. The coaching and mentoring activities would also encourage teachers to collaborate with their colleagues and work on collaborative ILSs, thus sharing their idea and experience while learning from each other.

The need for further support options such as coaching and mentoring on top of the Go-Lab Help-desk and the national and international training activities, will be investigated and

explored. The main focus of the first year is to set-up the help-desk function to be in position to support users in creating ILSs and using the Go-Lab services (see also section 5.2). Partners are asked to direct the teachers to use and get accustomed to the help-desk while the coaching and mentoring scheme is designed and established at a later stage provided that its need is evident based on users' comments and upcoming participatory design activities.

Ideally, coaches and mentors should be expert users of the Go-Lab ecosystem and well-aware of the different tools and functionalities it offers (thus act like coaches) in order to fully assume their role. Part of them also need to be well familiarized with the pedagogical aspects of the project (thus act like mentors); more particularly a) using inquiry in class; b) developing students' 21<sup>st</sup> century skills; c) assisting students with peer and self-assessment.

Although coaching and mentoring are similar they do have some important differences. In order to underline our understanding of the different roles, the following distinction is being made in the framework of the Next-Lab project:

- **Coaching** is focussing on **mastering the use of tools** while **mentoring** is more **content oriented**. We understand coaching to be more addressed to developing skills so it can focus more on mastering the use of certain tools (like apps and labs or the Graasp platform) while mentoring is more relationship oriented so it is better suited to make the teacher comfortable enough to share concerns and questions that have to do with the content and quality of an ILS.
- **Coaching is short term** while **mentoring is longer term**. Coaching a teacher on the use of certain tools can be done over a short period of time within a few sessions. Mentoring on pedagogical aspects on the other hand could take longer as teachers would need to time to feel comfortable enough to share any concerns they may have on the use of inquiry, test gradually its deployment in a class environment and be involved in an iterative process of refining an ILSs making it of high quality.

Coaching and mentoring activities are foreseen to take place within the authoring platform (Graasp). The team aims to take advantage of the discussion and collaboration facilities of Graasp to facilitate the coaching and mentoring scheme as best as possible. Teachers are able to add collaborators to an inquiry space, thus allowing them to view and/or edit the content of the space. Graasp facilities allow the chat between collaborators of a space, while any member of the space can view the history of changes made by other members. These two facilities allow teachers to work in collaborative spaces and communicate asynchronously. Additionally, space collaborators can also choose to have online discussions via online tools like Skype or Zoom. A teacher can invite any teacher or project member in a Graasp space directly, or ask for assistance through the help-desk.

Depending on the type of help the teacher would be asking for, the project team could help find or assign a coach or mentor. Aside from project partners, Go-Lab Ambassadors as part of the Next-Lab project will also be trained so they are in position to act as coaches and mentors for Go-Lab users and teachers. Go-Lab Ambassadors are teachers themselves they will be trained on both Go-Lab facilities and pedagogical aspects so they are in position to fully cover the needs of the teachers they will be summoned to assist. Go-Lab Ambassadors will be mostly assigned as coaches and mentors on teachers coming from their country so as to enable the support of teachers in their mother tongue thus making the process easier. However, they will of course be free to choose and assist any other teacher they wish.

Given that the Go-Lab project had a long list of dedicated teachers and that many of them are eager to promote and disseminate the Next-Lab project as well, the team aims to bring these on board as well, train them to become Next-Lab Expert Teachers and encourage them to take up the roles of coaches and mentors themselves. Given that such teachers will be involved in the project summer and winter schools the project team will have the opportunity to train them properly so as to uptake such roles.

## 5. Teacher-empowering Facilities

The Go-Lab teacher-empowering facilities aim to support teachers while working with the different platforms and services. Our aim is to support them in every step of the way, from finding a lab to creating from scratch high end ILSs, and empower them to become active, confident users of the system, eager to bring Go-Lab in their class. The main help services that will be offered to teachers, entail an around-the-clock helpdesk, through which teachers will be able to post their questions and get responses within the day as well as more dedicated tutoring and mentoring sessions where teachers will be able to work with a tutor privately or collaboratively with other teachers.

### 5.1 *Teacher empowering facilities in Graasp*

This section presents the main functionalities developed in Graasp to support teachers in the first 6 months of the project. Concretely, the section describes the rationale and the efforts done to support the management of the on-line community and the events organised in the project. Later on, we outline the roadmap for creation, personalization, awareness, assessment and reflection (Task 2.1 and 2.2).

During the Go-Lab project, many teachers from all the world were reached by means of dissemination events, training activities and the on-line platforms (including both the Golabz repository and the authoring platform). As a matter of fact, Go-Lab finished having trained more than 1'700 teachers and with more than 10'000 users registered in Graasp.

So far, the Go-Lab community<sup>3</sup> had been handled mainly by the national coordinators, who kept a register of those teachers that had been contacted, and the project mail lists. However, this approach presented certain limitations. First, in terms of scope, the number of teachers trained or subscribed to the mailing lists was only a subset of the community. Second, regarding the data collected, the record of teachers participating in the training or dissemination activities was not done systematically. Thus, the details collected about the participants were not always the same. And finally, since the information was distributed and managed “manually”, it was very complicated to rigorously ensure the data security and privacy.

#### 5.1.1 **Technical support for community and event management**

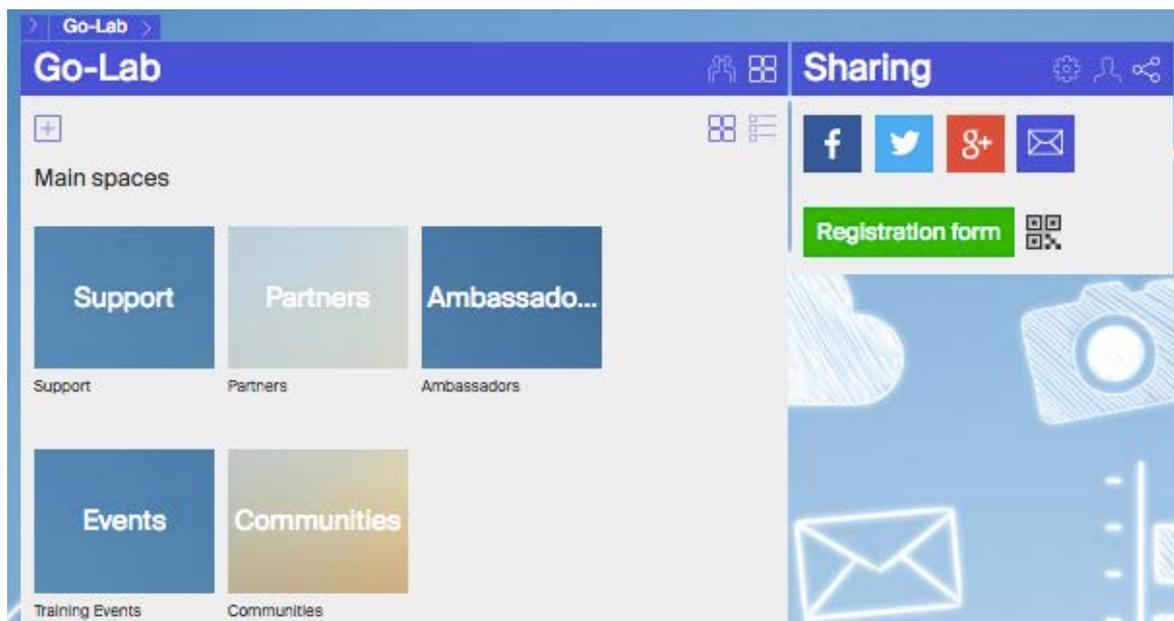
Taking into account the size of the Go-Lab community and its expected growth and the need for keeping teachers and users enrolled while preserving their security and privacy, in Next-Lab we decided to bring together the face-to-face and the on-line communities. Even though we had a tutoring platform (<http://tutoring.golabz.eu/>) that had been already used in Go-Lab, the activity registered in this platform was very low (mainly for webinars and sporadic tutoring sessions). Besides, the fact of using a third platform was confusing for the teachers. Thus, to support the community and overcome the aforementioned limitations, in Next-Lab we have extended Graasp in order to cover the management of the community and the events organised in its framework.

The Go-Lab community provides a space to bring together teachers, NECs and Go-Lab Ambassadors, enabling the interaction with peers at the national and international level and opening the communication between teachers and NECs/ambassadors. To join the community, the users should register through the following link:

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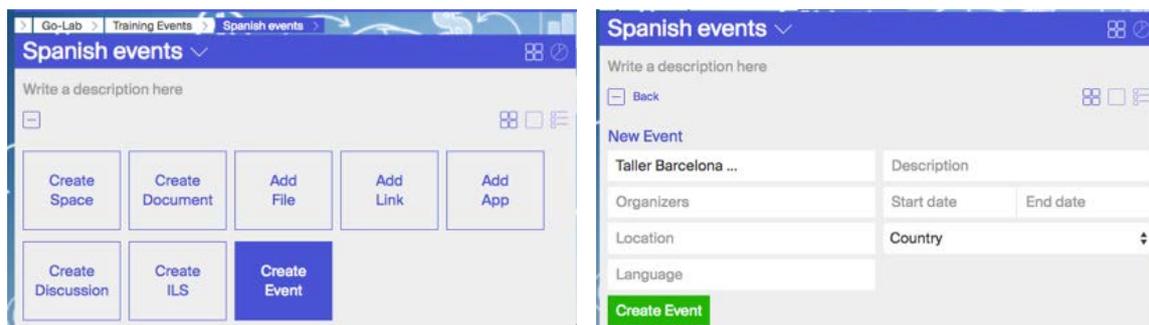
<sup>3</sup> It should be noticed that the community's name refers to the “Go-Lab” initiative instead of being called “Next-Lab”. This decision was made to avoid the confusion among the practitioners who already knew Go-Lab.

<http://graasp.eu/form/58ebae9d16d1ef214765bac1> In case any Go-Lab member wants to invite other users to join the community, the link to the registration form is available in the “Sharing” area (see Figure 3).



**Figure 3. Sharing the registration form to the Go-Lab community.**

Once in the Go-Lab community, NECs and Go-Lab ambassadors (or any other member with *owner* or *contributors* rights in Graasp), can create events for the national or international communities. The event-creation menu can be found among the rest of the items that can be added in a space (see Figure 4, left). When this option is selected, a form is displayed to gather a general description of the event (see Figure 4, right).

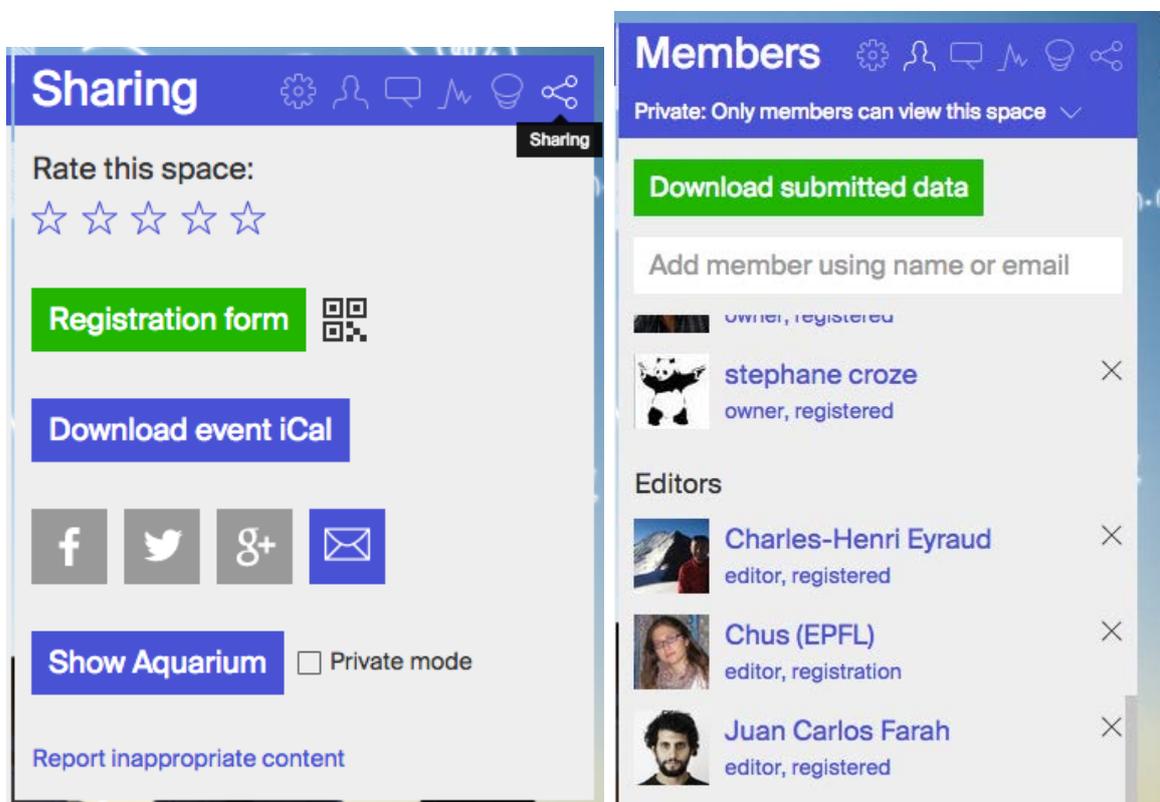


**Figure 4. Event creation: icon and description form.**

At this point, the event organisers can add as many resources as necessary to support the envisioned activities. Once the event is ready, the organisers can distribute the link to the registration form (available in the “Sharing area”, see Figure 5, left) among the potential participants. Thanks to the Graasp communication facilities, the organisers will be able to disseminate the event to all the members of the national (or international) community, increasing the chances to reach new teachers potentially interested.

When the participants open the link to the registration form, Graasp will require them to log in the system, provide some details about their profile (institution, country, level of the

students, ...) and agree to the terms and conditions<sup>4</sup> of the community. The usage of the registration forms has a fourfold purpose: systematically gather the user profile so that we can keep track of the teachers reached in the event, inform the organisers about the participants and their profiles, ensure that the participants agree with the terms and conditions of the community, and request their consent to be contacted by the project for dissemination purposes. At any point, the event organisers will be able to check who has registered for their events (see Figure 5, right), and view the profiles of the participants.



**Figure 5. Sharing the event registration form (left) and visualising the participants (right).**

Moreover, on a monthly basis, Task 1.4 will inform Go-Lab Ambassadors and NECs not only about the progress of the participants in the events (regarding their competences and skills), but also about the teachers from their country who gave us consent. We expect that this feedback helps NECs and Ambassadors to refine their training and to discover potential focus or expert teachers.

### **5.1.2 Roadmap for creation, personalization, awareness, assessment and reflection**

While, during the first six months of the project, the goal of Tasks 2.1 and 2.2 was to support NECs, Go-Lab Ambassadors, and Expert Teachers in the creation, personalization and management of the events; from now on, the main focus will be to empower the teacher activity. Regarding creation and personalization (T2.1) and in collaboration with WP4, Graasp will extend the already existing Go-Lab features in five main directions:

<sup>4</sup> Visit Deliverable D5.1 for further details about the registration forms or the terms and conditions of the community.

- Co-authoring: enabling easy synchronous and asynchronous co-creation of learning spaces.
- Recommendations: suggesting relevant teachers, as well as high-impact resources and apps from federated platforms.
- Progress recognition. Badges related to interaction metrics (gathered from all platforms) will be defined through participatory design (Task 4.4) and exploited for recommendations in the authoring platform and will contribute to impact evaluation of the project (Task 1.4 and Task 4.4).
- Guidance. Reinforcing the acquisition of both 21st century and core scientific skills by means of templates, scenarios, and recommendations.
- Usability. Facilitating the integration of web apps through drag-and-drop (in collaboration with WP3).
- Data management. Users will be able to personalise the data privacy management at the space level. Storage and access to contextual user-oriented analytics related to the usage and the activities of the co-creators will be provided (in collaboration with Task 4.2).

To support awareness, assessment, and reflection T2.2 will offer solutions based on contextual learning analytics and learning outcomes, following the project privacy and ethics policy described in D5.4, and according to the teacher's privacy configuration. More concretely, we will work on the following areas:

- App refinement: reviewing and adapting the learning analytics apps according to the teacher needs (T4.4).
- Interoperability: ensuring graceful degradation of features according to the privacy configuration and the available services.
- Awareness and reflection promotion: providing pre-set (but customizable) dashboards with recommended apps attending different purposes ( e.g., awareness and reflection related to the whole learning space or to specific apps).
- Assessment support: enable assessment of the students' work by facilitating the access to their productions during and after the session, and supporting the dialogue between teachers and students (e.g., via communication channels and dedicated apps enabling teachers to give feedback).

## **5.2 Help-desk Facilities: The Intercom Platform**

The project team made an initial proposal identifying the basic specifications required in order to materialize the Go-Lab Help-desk. Below we present our initial list of desired specifications regarding the help-desk infrastructure.

- The infrastructure should be able to gather submitted questions from every Next-Lab related facility (Graasp, Golabz);
- Access to all submitted questions needs to be available at all times;
- An option for flagging questions as resolved or not and who answered each question;
- Archiving and retrieving questions and answers (using keywords and/or topics)
- Automatic e-mail notification of corresponding help-desk collaborators
- Option of assigning rules to different help-desk collaborators.

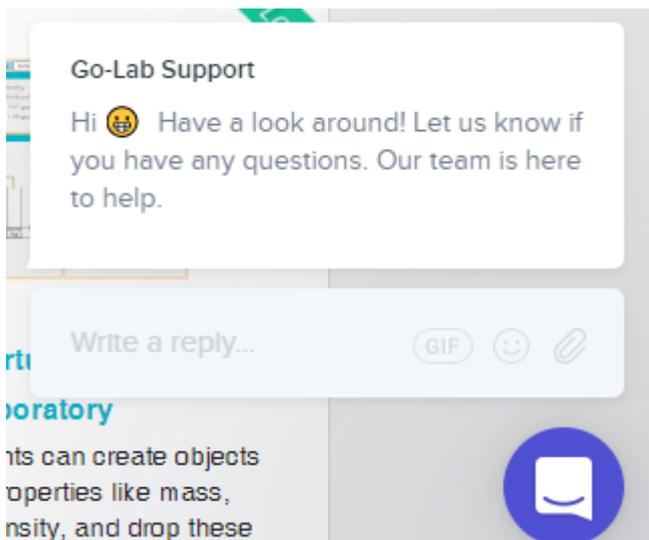
In collaboration with WP4, the project team decided to use the **Intercom platform**<sup>5</sup> to setup the Go-Lab Help-desk, a widely-used online facility for managing users' support requests, as it meets all the specification presented above.

NAME	LAST SEEN	TYPE	FIRST SEEN	SIGNED UP	WEB SESSIONS
Grupa 6	Just now	User	2 days ago	2 days ago	4
José Gonçalves (NUCLIO)	5 minutes ago	User	2 hours ago	3 years ago	2
Anastasiya Boiko EUN	4 minutes ago	User	21 minutes ago	3 months ago	1
dejong	24 minutes ago	User	2 days ago	3 years ago	15
merli palmik	3 minutes ago	User	7 days ago	2 months ago	3
Adrian Holzer	17 minutes ago	User	7 days ago	5 years ago	10
janine profijt	2 minutes ago	User	2 days ago	a year ago	4
Viviane van Doornik	34 minutes ago	User	7 days ago	2 years ago	8
Evgenij Myasnikov	41 minutes ago	User	7 days ago	2 years ago	17
Eletheria	40 minutes ago	User	3 days ago	5 years ago	5
Paula Ponte Souto	an hour ago	User	3 hours ago	an hour ago	1
Fellet Biderbost Giovanna	an hour ago	User	6 days ago	9 days ago	13
Dulce Carvalho	an hour ago	User	4 days ago	4 days ago	16
Kristina Vinkel	an hour ago	User	an hour ago	an hour ago	1
Denis Gillet	an hour ago	User	7 days ago	8 years ago	20
Carlos Calero Ortego	2 hours ago	User	2 hours ago	2 hours ago	1
Alex Wild (EPFL)	2 hours ago	User	7 days ago	3 years ago	11

**Figure 6. The Intercom Platform – Users Overview.**

Using Intercom, the project team is in position to monitor users' questions coming from the Go-Lab facilities and answer back on demand thus facilitating the direct support of teachers. Teachers are able to use the Intercom icon added in the Golabz portal and in Graasp and sent their question to the support team of the project. When entering Golabz or Graasp for the first time the pop-up message presented in Figure 7 is displayed.

<sup>5</sup> <https://www.intercom.com/>

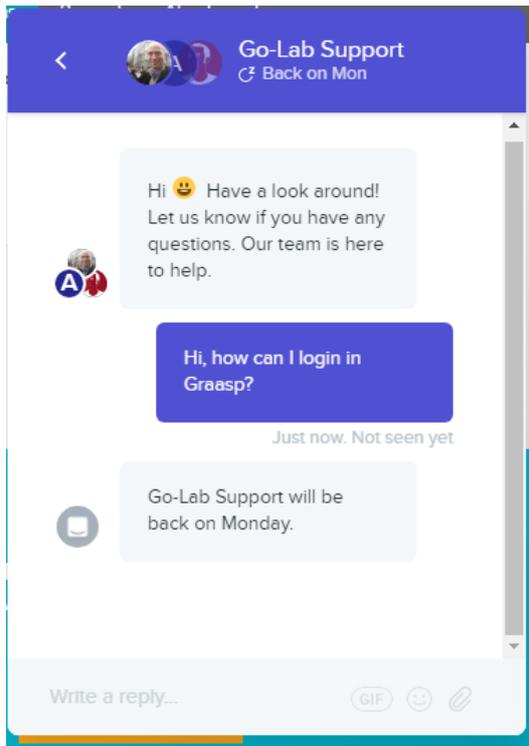


**Figure 7. The Intercom integrated function for direct teachers' support.**

Every time a user sends a message, the support team is notified via browser, app or e-mail. Intercom streamlines the creation and management of support tickets, allowing those that work in Intercom to collaboratively answer questions and resolve issues put forth by Go-Lab users.

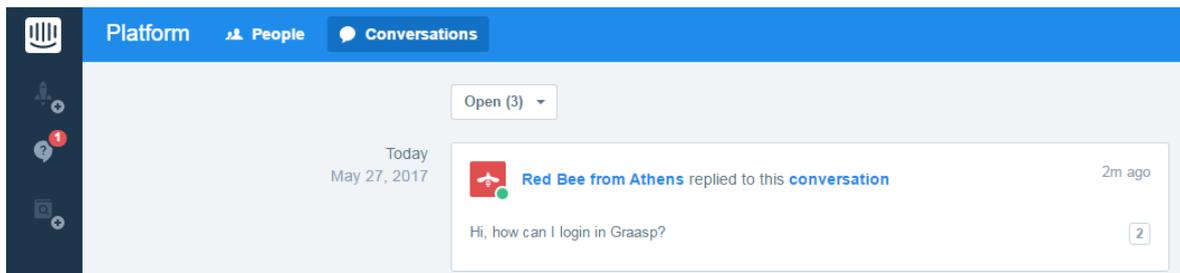
### **5.2.1 Intercom functions**

As mentioned above any Go-Lab user will be able to share a question using the Intercom button integrated in Graasp and in Golabz. The Intercom button opens up a chat box where the user can post a question. Users can also choose to send a screenshot of their problem as an attachment option is available.



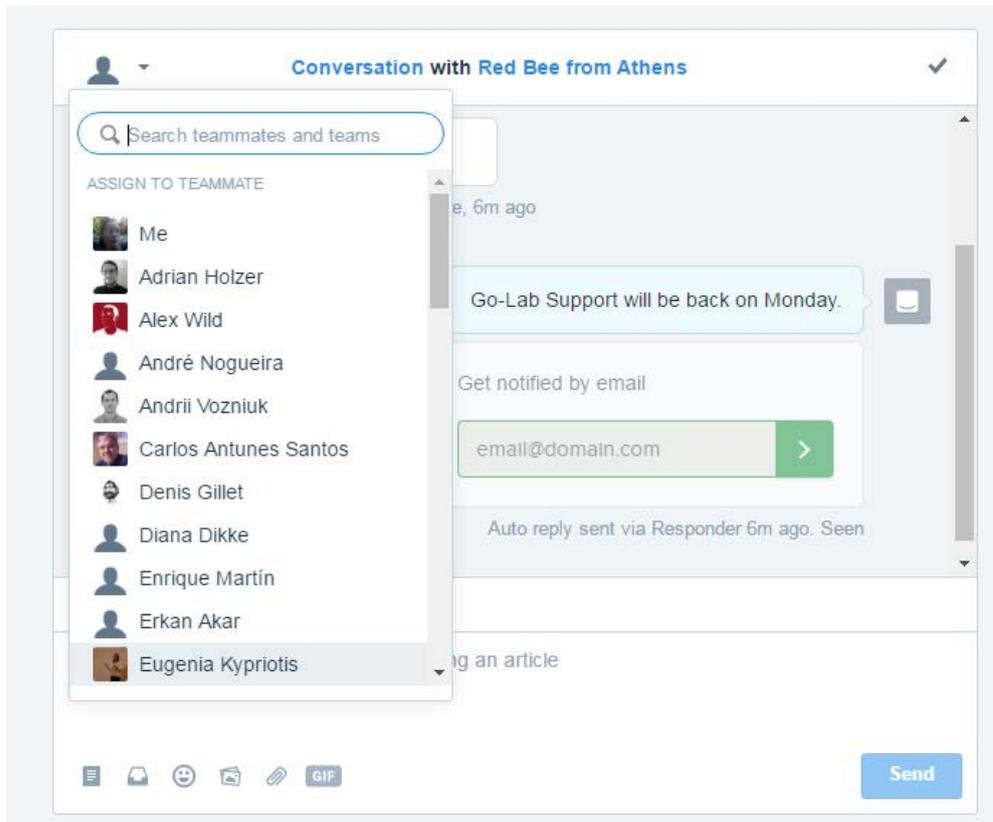
**Figure 8. A user posts a question.**

Once the question is posted, it appears on the list of open conversations in the Intercom platform for all help-desk members to view. Help-desk members also have the option of getting notified via e-mail every time a new question comes up or when a question is assigned to them.



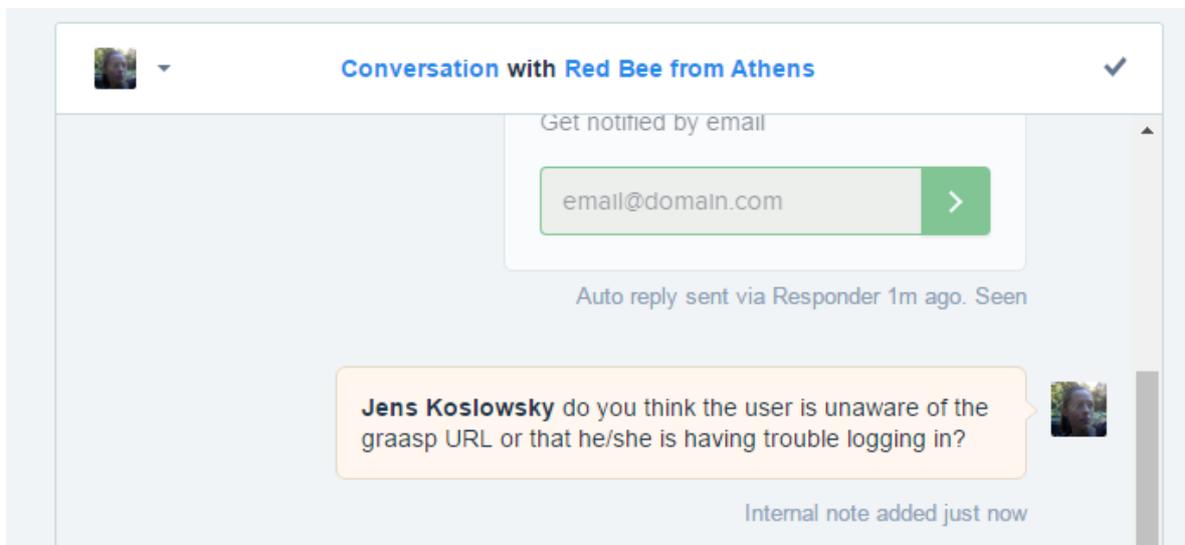
**Figure 9. User question coming up on the Intercom platform.**

After clicking on the conversation, a help-desk member can either answer directly to the user, or assign that question to another member.



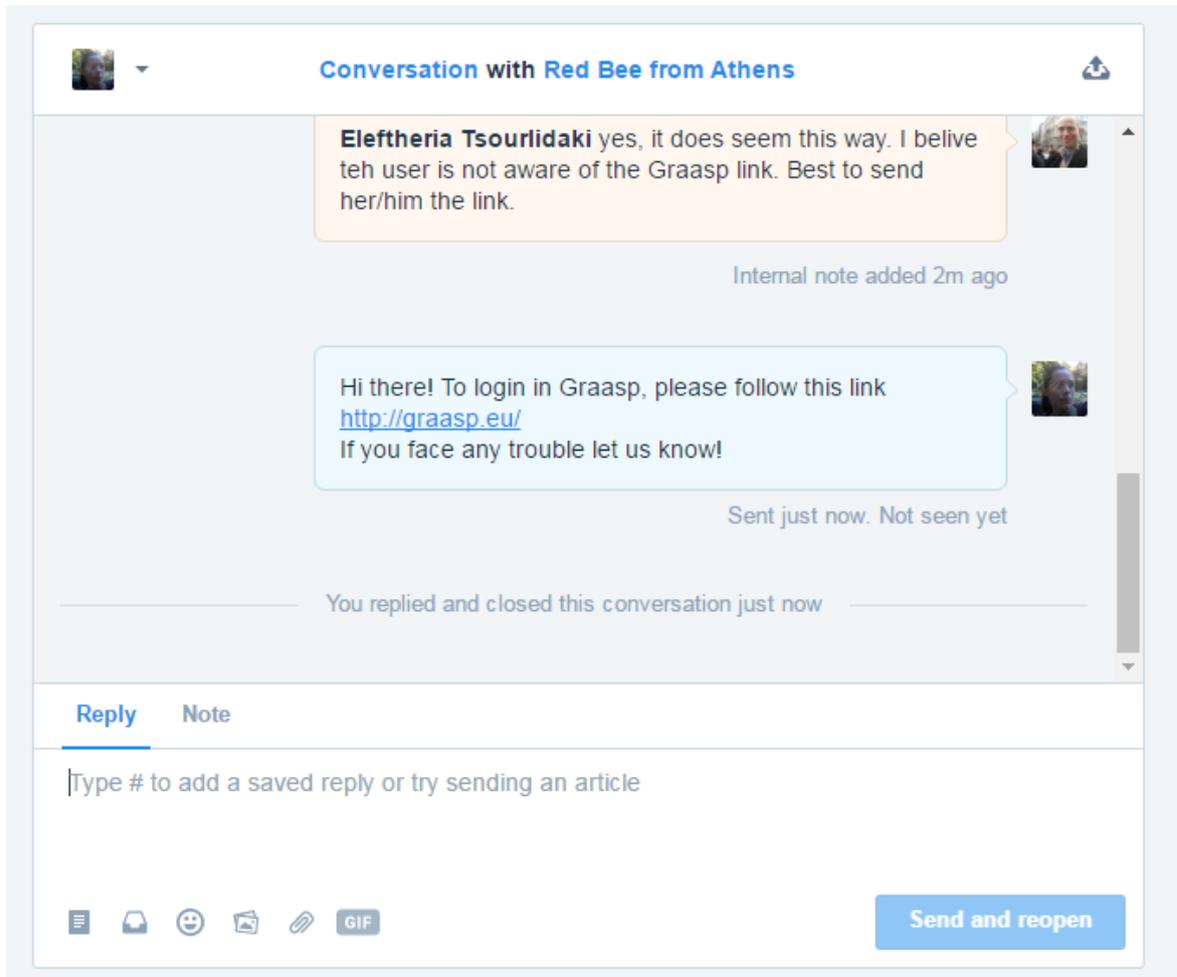
**Figure 10. Assigning user questions to team members.**

Sometimes, depending on the question, the help-desk members might need to exchange information over it before answering to the user. This can be done directly on the same conversation without the user being part of it through the “Note” function.



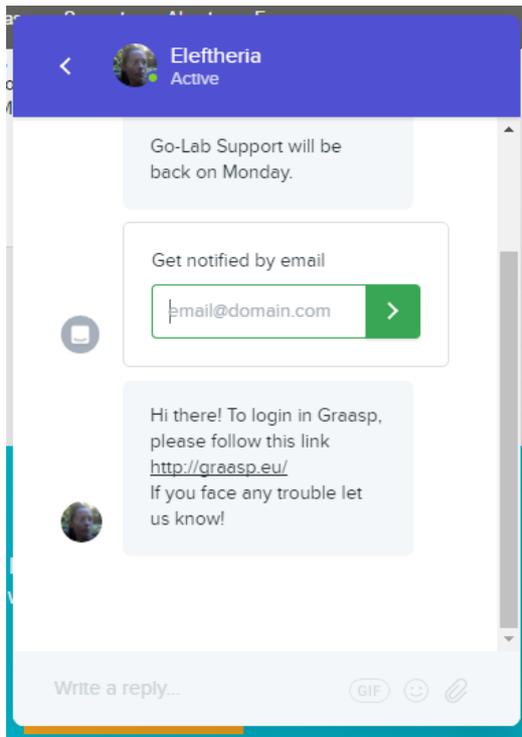
**Figure 11. Internal notes between help-desk members on the particular conversation.**

Once the help-desk members answer to the user, they can mark the conversation as closed.



**Figure 12. Answering to the user and closing the conversation.**

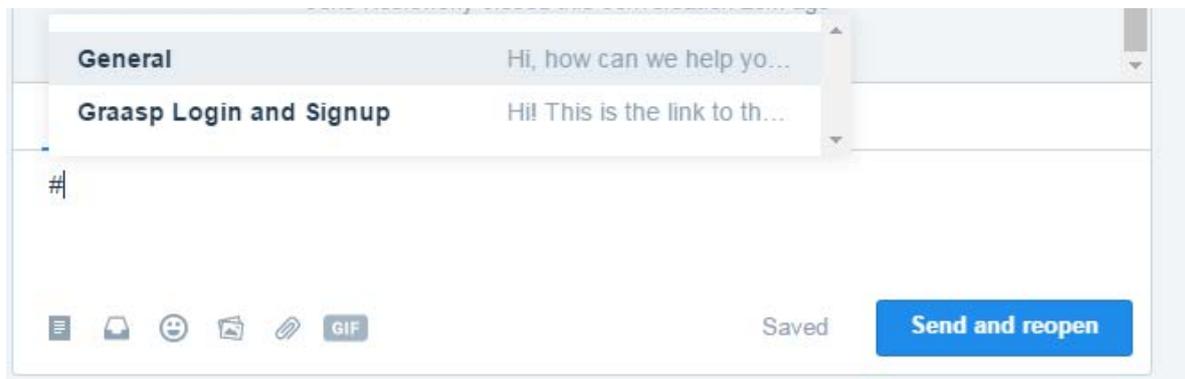
The user will see the response in the chat box. As seen in Figure 13, users also have the option of getting notified by e-mail when the help-desk replies to their question.



**Figure 13. Answer form the user's end.**

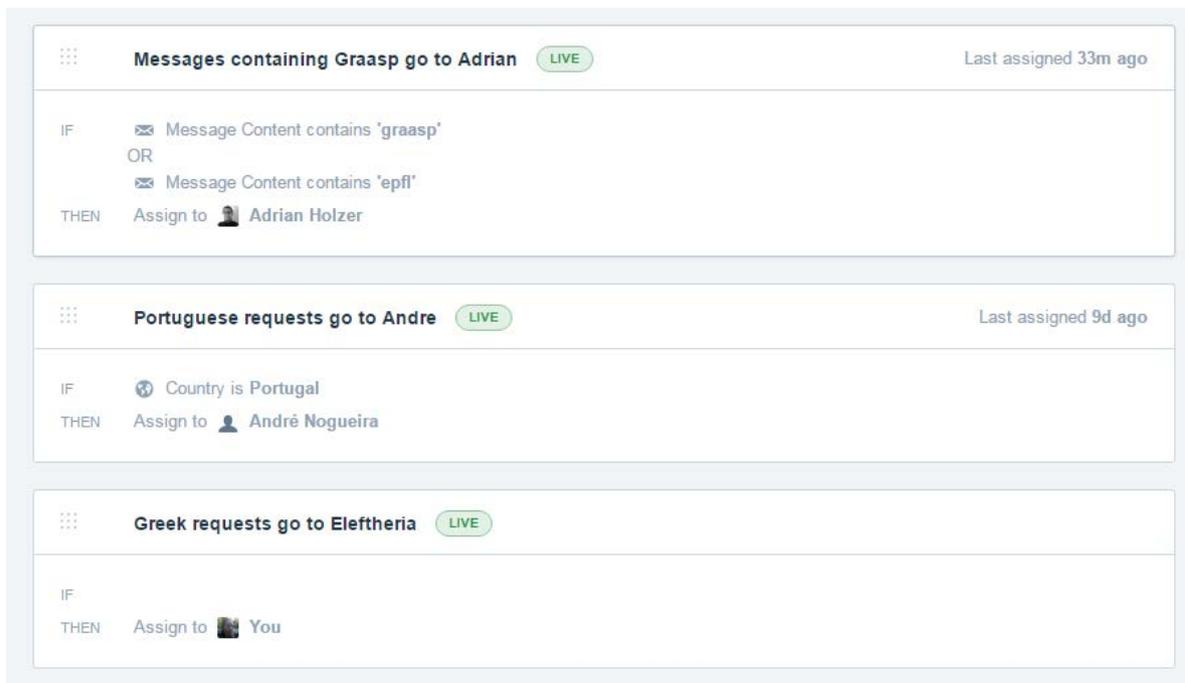
All answered questions can be marked as closed so that members can have an overview of which questions are answered (and by whom) and which are not. Help-desk members can have access to all open and closed conversations at any time.

Additionally, members can save a number of predefined responses so they may have them available for future use. Responses can be easily retrieved by type '#' on the answer box.



**Figure 14. Option for adding a predefined answer.**

In order to manage questions in a coordinated way, the project team also has the option of creating rules and assigning automatically certain types of questions to certain members or teams.



**Figure 15. Rules created in Intercom to assign questions to partners.**

As demonstrated above, Intercom facilities cover all the prerequisites our team had initially set. The system is intuitive and user friendly so that all help-desk members are in position to use it after a short training. The functions and facilities of Intercom will allow us to further refine our help-desk service and make it as effective as possible both for users and project partners.

### 5.2.2 Assignment of Enquiries

Besides the platform administrators at Intercom, currently 52 people have been invited as part of Go-Lab to be involved through Intercom in providing help to users. These include representatives of NECs and Go-Lab Ambassadors. In order to better coordinate and manage incoming questions smoothly, the project team has decided to make use of the functionality offered by Intercom and create a set of initial internal rules in Intercom and assign roles to partners. As these rules and roles exist to ensure the smooth running of the help-desk, they are open to modifications any time the team sees fit.

Additionally, there is always the function of assigning a question to any member or chat with another member internally so additional needs and redistribution of questions can be done directly when needed. The distribution of roles is such so that roles are assigned to partners according to their expertise and the person months allocated to this task. However, while distributing work among partners and Go-Lab ambassadors we also took into consideration the direct communication of teachers with the NECs and ambassadors as well as partners coming from their country. Go-Lab Ambassadors are also part of the help-desk service and they will mainly contribute to questions coming from their own country. This way, we can enable users to communicate in their mother tongue, while their interaction with the local Go-Lab ambassador/expertise centre/partner will also contribute in building stronger relationships between them leading to stronger local Go-Lab communities.

The set of initial rules are:

- English general questions go to NUCLIO and EA team
- English questions containing the word 'Graasp' go to EPFL team
- Questions from Greece go to EA team
- Questions from Portugal go to NUCLIO team
- Questions from Spain go to UD team
- Questions from the Netherlands go to UT team
- Questions from France go to ENS team
- Questions from Estonia go to UTE team
- Questions from Switzerland go to EPFL team
- Questions from Germany go to IMC team
- Questions from Cyprus go to UCY team
- Questions from Finland go to UTU team
- Questions from UK go to ULEIC team
- Questions from Croatia, Czech Republic, Former Yugoslav Republic of Macedonia, Hungary, Israel, Italy, Latvia, Lithuania, Malta, Poland, Romania, Serbia, Slovakia, Sweden, Switzerland, Turkey go to the respective Next-Lab ambassadors

### 5.2.3 Monitoring incoming questions and help-desk performance

Intercom has an insights function that will allow us to monitor incoming traffic of questions easily and have an idea of the help-desk's most active users. We can have a quick overview of the new conversations coming in at any time interval selected and of the average response time (Figure 16)



**Figure 16. Quick overview of new responses and average response time.**

Additionally, we can have a more detailed presentation of incoming questions per day, per date or per hour so we can try to identify patterns as to which days or times of the day are most active (Figure 17).



Figure 17. Over view of conversations per day.

Intercom insights can also indicate the performance of the help-desk members. This way we can check if any members are under performing or if there are cases where members are overloaded and there is a need for redistributing tasks (Figure 18).

**Teammate performance**  
See how every member of your team is doing

TEAMMATE	# REPLIES	# CLOSED
Adrian Holzer	64	32
Alex Wild	8	16
André Nogueira	3	1
Andrii Vozniuk	15	1
Carlos Antunes Santos	0	0
Denis Gillet	3	1
Diana Dikke	0	0
Eleftheria Tsourlidaki	11	9

Figure 18. Help-desk members' performance overview.

### 5.3 Co-created Learning Spaces

So far, the Golabz repository of Inquiry Learning Spaces (ILSs) consists mostly of teacher-developed ILSs. One of the aims in Next-Lab is to offer to teachers as additional support a set of exemplary, high quality, learning spaces co-created between teachers and technical, graphical or instructional design experts. The related task (task 2.5) is expected to start from Month 13 on, but already NECs have started to discuss topics and the planning of the

activities. In the upcoming months, the Next-Lab team will initiate the design and creation of around 40 exemplary learning spaces targeting curriculum topics that were identified as common in primary education in Europe (see also WP1, Task 1.6).

#### **5.4 Additional Support Facilities**

According to the Next-Lab support and help services Participatory Design Activity mentioned at the beginning of section 4, videos are the support tools most users use, need and are aware of. The Go-Lab MOOC and community forum are less used and fewer users were aware of them. The “Frequently Asked Questions” (FAQ) and “Tips and Tricks” sections are known to some users but very few of them use it. However, the FAQ section seems to be a ‘must have’ according to teachers views. Finally, the Go-Lab Manuals are known to many users but very few of the have used them.

The project team aims to invest most on the tools that seem most useful to users but at the same time make an effort to boost other tools as well. To this end, we will make use of the existing support tools that were created during Go-Lab. We aim to revisit, update and upgrade the existing Support page and its components:

- *Tips and tricks section*

The tips and tricks section includes a list of 61 tips on different topics. Updates in this section include the update of the answers on some of these questions while trying to make them more compact. When applicable, the team will use animations or small videos to make the answers more interesting for teachers. We will also aim to shorten this list down and replace some of these questions with new ones. Given the relatively long list of tips the team will also prioritize them keeping the most important ones in view and adding the rest in a ‘more’ section. Our experience and questions coming to the team from the help-desk will help us a lot to revise this section.

- *Frequently Asked Questions (FAQ)*

The team could consider moving the FAQ section currently located in the Go-Lab project official website to the Golabz page so teachers could have direct access from our portal. Questions in this section will be revised and edited according to new developments related to the Go-Lab services. Additional questions will be added when needed and some questions may be deleted if they are found obsolete. Help-desk questions will help us a lot revise this section as well.

- *Video tutorials*

We already have at our disposal video tutorials on the use of Graasp, and many apps. However, the team keeps developing new tools and updating the existing ones. Thus, the team will ensure the addition of videos on the new apps and features while existing videos will be substituted when needed.

- *Online courses (MOOC)*

The project team already has at its disposal one online course that was developed during the Go-Lab project. Given that our team aims to provide materials for the online training we will also make available these materials to all teachers. These materials will be a combination of resources, like how-to videos, presentations, practice activities and more.

The Community forum will remain active, while we will also keep available for teachers' updated versions of our user manuals. Next-Lab partners will also set up webinars for teachers when needed.

## 6. Outlook

During the course of the remaining time of the Next-Lab project the efforts to empower teachers will not cease and WP2 as well as all Next-Lab partners will be in an ongoing dialogue with the (potential) Go-Lab user of all Go-Lab User Profiles to understand user needs in terms of help and support activities. It is essential to listen to the users and to develop the tools and activities they need, instead of investing into planned features that turn out to have low impact. After all, the goal is to put the teacher in the centre of our efforts and provide them with an even better service that will make it easier to plan and implement modern, innovate science education.

Training teachers will remain one of the most important support activities, both on national and international level. But in order to shape and build common, modular and effective training, the development of the Go-Lab Competence and Skills Framework will be a central but challenging task. Nonetheless, it will enable and safeguard the efforts to offer a common Go-Lab training program that provides training material that effective to push users to advance in their “teacher journey” and to become Expert users in Go-Lab.

Even after its first few weeks of implementation, already the Intercom Platform proves to be an excellent tool for the ad-hoc Go-Lab Help-desk to offer support from users from all over the world. At this moment, most of the over 100 conversations between Go-Lab users and the Help-desk team in the period from April 2017 to June 2017 are about technical issues, but the appreciation of users being helped on the spot is palpable. With time and the new school year starting in September we expect more users to start conversations with the Next-Lab team about all topic ranges of Go-Lab.

The co-authoring of ILSs will become an important focus in the work of WP2 in the upcoming year, as we hope to achieve greater collaboration among teachers in the development of ILSs as well as with experts from the academic sector. This is not only true for the activities in task 2.5, but also for the work in tasks 2.1 and 2.2. Moreover, initial discussions have been made to devote some of the international training activities to encourage co-creation.

Last, but not least the technical team will continue enhancing the teacher empowering facilities in Graasp to provide an even better Go-Lab ecosystem for teachers, by analysing the use of tools and enhancing their functions and responding to user needs. User badges – possibly also connected to the Go-Lab Competence and Skill Framework - will be introduced and exploited for recommendations in Graasp.

## Annex 1 – Application form for Next-Lab Summer School 2017

### 1. Application Form for Next-Lab Summer School 2017

#### Next-Lab Summer School 2017

##### Teacher application form

[https://docs.google.com/forms/d/1p9P-wQBcW3lYicm73\\_5AX4c\\_a6UWWXDK4naqkBe2NYE/prefill](https://docs.google.com/forms/d/1p9P-wQBcW3lYicm73_5AX4c_a6UWWXDK4naqkBe2NYE/prefill)

#### A) Basic Information:

##### Participants' information:

- First Name:
- Family Name:
- City:
- Country of residence:
- E-mail:
- Mobile:

##### Teaching experience:

- School type I am working in (secondary / primary):
- Years of teaching experience:
- Teaching subjects:
- Age of students I am mostly working with:

#### B) Experience with Graasp / Go-Lab

- 1) **When** and **why** have you started using Go-Lab / Next-Lab? How many ILSs have you **created** and **published**? (*Please share the links with us*)

(max. 1500 characters)

- 2) Have you ever implemented any ILSs in your classrooms? Please share your **experience!** (*time / number of implementation, number of students, subject field, integration into the school curriculum, etc.*)

(max. 1500 characters)

- 3) Why do you think Go-Lab / Next-Lab is a good tool for science education in schools, but also how and what is it problematic? Describe us your personal experience about the **advantages** but also the **disadvantages** of using Graasp / ILS in a classroom!

(max. 1500 characters)

**C) Go-Lab / Next-Lab training & support**

- 1) Have you participated in face-2-face or online training or used the support material on Golabz? Share with us your experience – what was good, what was bad?

(max. 1500 characters)

- 2) Please explain why you should participate in (additional) Next-Lab trainings and what do you hope / expect to learn from trainers **and** other teachers attending?

(max. 1500 characters)

**D) Your participation in Go-Lab / Next-Lab**

- 1) In what way have you been involved in the Go-Lab / Next-lab project activities in the past? How have you personally contributed to advance the use and development of Go-Lab / Next-Lab in your school, region or country? ( e.g., participatory design activities, workshops, conferences, training to colleagues, etc.)

(max. 1500 characters)

- 2) How would you like to be involved in future activities in Next-Lab? Do you have any ideas how to promote and contribute to the use of Go-Lab / Next-Lab in your school, region or country?

**(max. 1500 characters)**

## Annex 2 – Next-Lab Workshop Instruction Template

### Next-Lab Face-to-Face Training Workshop Instructions

#### Basic information

<b>Workshop title:</b>	
<b>Estimated total workshop duration:</b> (max. 3 hours)	
<b>Organization creating workshop materials:</b>	
<b>Related Next-Lab Task:</b>	
<b>Link to Graasp:</b>	

#### Requirements

<b>Prior Next-Lab / Go-Lab knowledge of participants needed?</b>	
<b>Minimum/maximum number of participants:</b>	
<b>Special infrastructure needed:</b> (apart from computer and internet access)	

#### Workshop structure and organization

<p><b>Rational and objectives</b></p> <p><i>Briefly describe the main topics &amp; objectives this workshop will address. What are the learning goals and the 'theory' you want to cover?</i></p>
<p><b>Workshop details</b></p> <p><i>Please add information needed to organize the workshop ( e.g., number of tutors needed, group organization, equipment and materials needed for each part, relative links/preparatory materials for participants)</i></p>

## Workshop activities description

Each workshop has 3 main parts:

- A) an introduction and core presentation or demonstration,
- B) a hands-on and minds-on activity, and
- C) a wrap-up activity.

Please provide a small description for each of the parts, so that a trainer / tutor is able to implement the workshops and knows what she/he is expected to do. Provide information so that he/she is aware of the structure, process, and time-plan of the session, as well as what to watch out for and to prepare all the necessary materials that he/she should use.

(Fill free to add pictures from other workshops, print screens or images of the materials if needed)

### Part A – Introduction / Core presentation / Demonstration

#### Workshop Instructions:

Depending on the subject, you might want to prepare a PowerPoint presentation or use alternative means of presentation like a demo directly on the system. Fill free to do it any way you think it is best. If you do a PowerPoint presentation, please use the official Next-Lab template for presentations available in Graasp. This parts should not be more than 30 minutes.

If you want to have one PowerPoint that is used throughout the activity in the “documents needed for this part” please indicate the slides that need to be used in this part.

**Documents/links needed for this part:**

**Estimated time:**

**Part B - Hands-on and minds-on activity****Workshop Instructions:**

*Teachers always appreciate hands-on activities more than lectures and they are much more engaged in them. Thus, the core of each workshop needs to be a hands-on activity. Depending on the subjects, a hands-on activity can be an activity using the Go-Lab platform or an activity that uses other materials. It may not even need computers. Please describe the activity the tutors should do, how it is connected to the topic of the workshop and what materials they will need to use and prepare. Guidelines for organizing and handling the participants would be helpful.*

**Documents/links needed for this part:****Estimated time:****Part C - Wrap-up activity****Workshop Instructions:**

*Every workshop should conclude with a wrap-up part to summarize what was learned, the connection to the Next-Lab/Go-Lab system and/or to the project's main objectives (for example promoting 21st century skills). Please describe here the wrap-up activity you would like tutors to do (could be a conversation, filling in a questionnaire, taking a vote). If any necessary additional materials need to be prepared (like a ppt) you'll need to prepare them.*

**Documents/links needed for this part:****Estimated time:**

## Annex 3 – Proposed Workshops of the Summer School 2017

### Domain 1: Pedagogy / IBSE

Domain	Title of course / workshop	Training content & goal(s)	Connection to Next-Lab tasks (Task leader)	Development of workshop by
Pedagogy / IBSE	<b>IBSE I</b> IBSE and beyond ( e.g., Innovative pedagogies and tools: multi-media learning theory, using videos, cognitive load theory, flip the classroom, TPACK, gamification, collaborative learning, feedback, etc.)	<ul style="list-style-type: none"> <li>- Importance of inquiry based learning for students and teachers</li> <li>- Learn about additional learning / teaching strategies that support IBSE</li> </ul>	<i>Not connected to a specific task.</i>	<b>ENS</b>
	<b>IBSE II</b> Spreading the word on Inquiry: How to introduce inquiry to peers and identify opportunities for classroom integration	<ul style="list-style-type: none"> <li>- Techniques and approaches on how to effectively introduce inquiry to peers.</li> </ul>	<i>Not connected to a specific task.</i>	<b>EA</b>
	<b>Pedagogy I</b> Innovative learning approaches: The Big Ideas of Sciences as a chance to apply interdisciplinary learning	<ul style="list-style-type: none"> <li>- Understanding the potential of Next-Lab and the Big Ideas of Science for classroom teaching</li> <li>- Present opportunities to integrate inquiry in the class aligned with national curricula</li> </ul>	Task 1.6 - Lining up with national curricula (EUN)	<b>EA</b>
	<b>Action Workshop</b> "Pimp my ILS" - Working in groups to improve existing ILSs to facilitate exchange of ideas and strategies	<ul style="list-style-type: none"> <li>- Practical work on refining ILSs and proposing targeted changes. Teachers will be given an "average" ILS which they will be invited to upgrade but also use it as a sandbox throughout the course to test new things and tools</li> <li>- Provide opportunities for co-creation of Next-Lab learning spaces</li> </ul>	Task 2.3 - Tutoring (EA) Task 2.4 - Networking and training (EA)	<b>NUCLIO</b>

**Domain 2: Use of the Go-Lab Eco-system**

Domain	Title of course / workshop	Training content & goal(s)	Connection to Next-Lab tasks (Task leader)	Development of workshop by
<b>Use of the Go-Lab Eco-System</b>	<b>New Features and Services I</b> Labs and apps	Presentation, testing and understanding the optimum use of new features by users	Task 3.5 - Labs and Apps (UT)	<b>UTE</b>
	<b>New Features and Services II</b> Optimum use of the new Next-Lab tools (collaboration, feedback, monitoring, ePortfolio, self- and peer assessment / dashboard, modelling app)	Presentation, testing and understanding the optimum use of new features by users	Task 3.1 - 21st century skills (UT) Task 3.3 - ePortfolio (EPFL) Task 3.4 - Modelling (UT)	<b>UD</b>
	<b>New Features and Services III</b> Professional Learning Spaces - Introduction & Presentation	Presentation, testing and understanding the optimum use of new features by users	Task 2.5 - Co-created learning spaces (UT)	<b>UTU</b>
	<b>New Features and Services IV</b> The Next-Lab coaches and mentors - Goals, functions and tools	<ul style="list-style-type: none"> <li>- Understanding the new service and functions of the support mechanism</li> <li>- Being able to act as a Next-Lab coach &amp; mentor</li> </ul>	Task 4.1 - Tutoring Platform (IMC) Task 2.3 - Tutoring (EA)	<b>NUCLIO / IMC</b>

**Domain 3: 21<sup>st</sup> century skills / Learning Assessment in Go-Lab**

Domain	Title of course / workshop	Training content & goal(s)	Connection to Next-Lab tasks (Task leader)	Development of workshop by
21st century skills / Learning Assessment	<b>21st Century Skills I</b> Introduction to 21st century skills - Why are they important and how can Next-Lab support them?	<ul style="list-style-type: none"> <li>- Understanding of the importance and relevance of 21st century skills for students</li> <li>- Understanding the new role of the teacher in facilitating 21st century skills</li> </ul>	Task 3.1 - 21st century skills (UT)	<b>EA</b>
	<b>21st Century Skills II</b> Awareness, assessment and reflection Apps and tools for teachers in Next-Lab How can teachers understand the learning analytics of Next-Lab students?	<ul style="list-style-type: none"> <li>- Understand how Next-Lab features can be used to facilitate the 21st century skills</li> <li>- Knowing how to use the Next-Lab tools for assessing skills (for both, students and teachers)</li> </ul>	Task 3.2 - Self- and peer assessment (UCY) Task 2.2 Awareness, assessment, and reflection (EPFL)	<b>UCY</b>

**Domain 4: Multiplication / Communication**

Domain	Title of course / workshop	Training content & goal(s)	Connection to Next-Lab tasks (Task leader)	Development of workshop by
Multi-plication / Communication	How to become an effective Next-Lab multiplier?	<ul style="list-style-type: none"> <li>- Enable participants to organise engaging workshops in their region to train peers in the use of Next-Lab</li> <li>- Learn how to motivate peers to use Next-Lab</li> </ul>	Task 1.2 - Teachers (EUN)	<b>EUN</b>
	Social Media and Visual Identification	<ul style="list-style-type: none"> <li>- How to use social media for community building</li> </ul>	Task 1.5. Dissemination material (IMC)	<b>EUN</b>