

# Next-Lab

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

*Innovation Action in European Union's 2020 research and innovation programme*

*Grant Agreement no. 731685*



### Deliverable 2.7

## **Final releases of the creation and personalization services, as well as the awareness, assessment, and reflection solutions**

Editor	Denis Gillet (EPFL)
Date	21 <sup>st</sup> December 2018
Dissemination Level	Public
Status	Final



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## **Executive Summary**

This document presents the final releases of the creation, personalization, awareness, assessment and reflection features of the Graasp authoring and learning platform. The related developments have been carried out in the framework of Task 2.1 dedicated to supporting creation and personalisation of learning spaces, as well as Task 2.2 dedicated to supporting awareness, assessment, and reflection for teachers. Task 2.1 will continue during the third year of the project to enable fine tuning of the Graasp user interface, while Task 2.2 is now completed.

Features described in this document are the ones foreseen in D2.3 (Initial releases of creation, personalization, awareness, assessment & reflection solutions) and actually implemented taking into account consolidated requirements from the teachers and available development resources. One should also mention that the final features selected for implementation have been prioritized in order to make the usage of the platform more simple, as well as to contribute to its sustainability from a Technical Readiness Level point of view, i.e. only additions and improvements of existing features increasing this level have been considered. The scope of the platform beyond inquiry-based learning with online labs and towards more general digital education and knowledge sharing applications has also been considered to increase the adoption opportunities by user communities.

The main new features are the badges visualized in the community spaces, eBook and pdf generation support, as well as the new page view.

The actual deliverable is the [graasp.eu](http://graasp.eu) authoring and learning platform with its final releases of new and improved features. This report is just an accompanying document listing and describing in a compact form the features released in 2018.

## Table of Contents

1.	Introduction	7
2.	Online support for the Go-Lab community and some analytics	8
3.	Creation and personalization services for teachers	11
4.	Awareness, assessment and reflection solutions for teachers	16
5.	Page view	17
6.	Other improvements	20
7.	Conclusion and outlook	22

## 1. Introduction

This document presents the final releases of the creation, personalization, awareness, assessment and reflection features of the Graasp authoring and learning platform. The related developments have been carried out in the framework of Task 2.1 dedicated to supporting creation and personalisation of learning spaces, as well as Task 2.2 dedicated to supporting awareness, assessment, and reflection for teachers. Task 2.1 will continue during the third year of the project to enable fine tuning of the Graasp user interface, while Task 2.2 is now completed.

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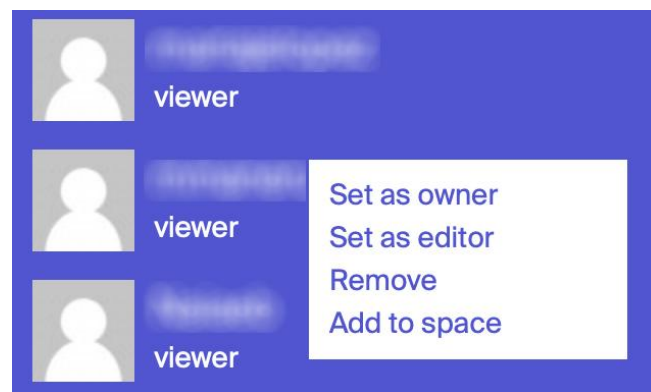
This deliverable covers 5 main parts. First, in Section 2, we introduce the additional services developed to support the community management, especially the badges. Second, we describe final releases of the creation and personalization services (Section 3), as well as the awareness, assessment, and reflection solutions for teachers (Section 4). We also introduce the new Page View (Section 5) which will not only replace the Standalone View, but also will enable to switch in any space and for any user between creation (authoring) and visualisation (publishing and learning) in a seamless way. Finally, a lot of other improvements and bug fixes are listed (Section 6).

In order to clarify the differences and connections between the WP2 deliverables, it should be noticed that those titled as releases focus on the description of the technical solutions (i.e., deliverables 2.3, 2.7, and 2.10), while the ones reporting on the (initial/consolidated) 'implementation' of teacher-empowering facilities and activities tackle, among other aspects, how the releases have been adopted by users so far.

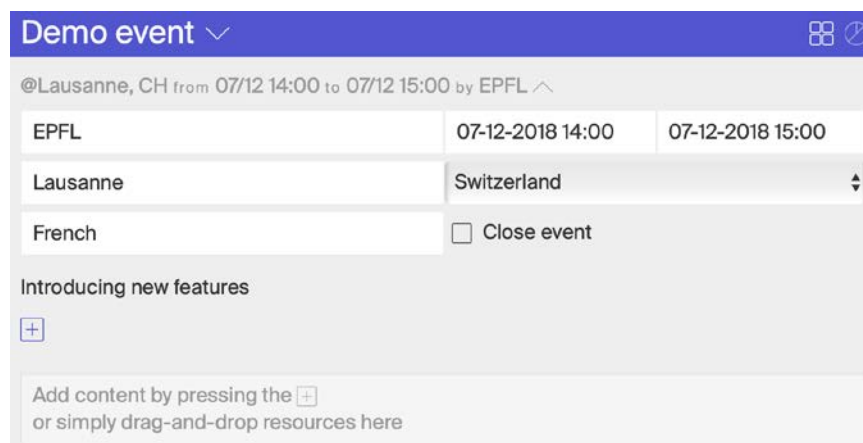
## 2. Online support for the Go-Lab community and some analytics

The Go-Lab community in Graasp is a dedicated space (<http://golab.graasp.eu>) that members can join by invitation or through registration. While joining through registration, additional data are collected about the members through a form they can fill-in, as well as their consent. Most of the registrations are triggered by national coordinators (NECs) and ambassadors when events are organized and held. As of December 7, 2018, this community has 2'741 registered members. Data and consent collected in the community are exploited for assessing the impact of the project in the framework of Task 1.4. One should note that African teachers recruited through the Go-Ga project are not integrated in the Go-Lab community. Another [africa.graasp.eu](http://africa.graasp.eu) community has been created for decoupled impact assessment purpose.

Two community features were envisioned in D2.3 and have been implemented. First, *facilitating invitations to spaces for groups of selected users* (Fig. 1) and second, *allowing event organisers to close or limit the registrations* (Fig. 2).



**Figure 1. Group drag-and-drop invitation (first select multiple members, then use the contextual pop-up menu to add them to another space).**



**Figure 2. Closing registration for an event by selecting the corresponding check box.**

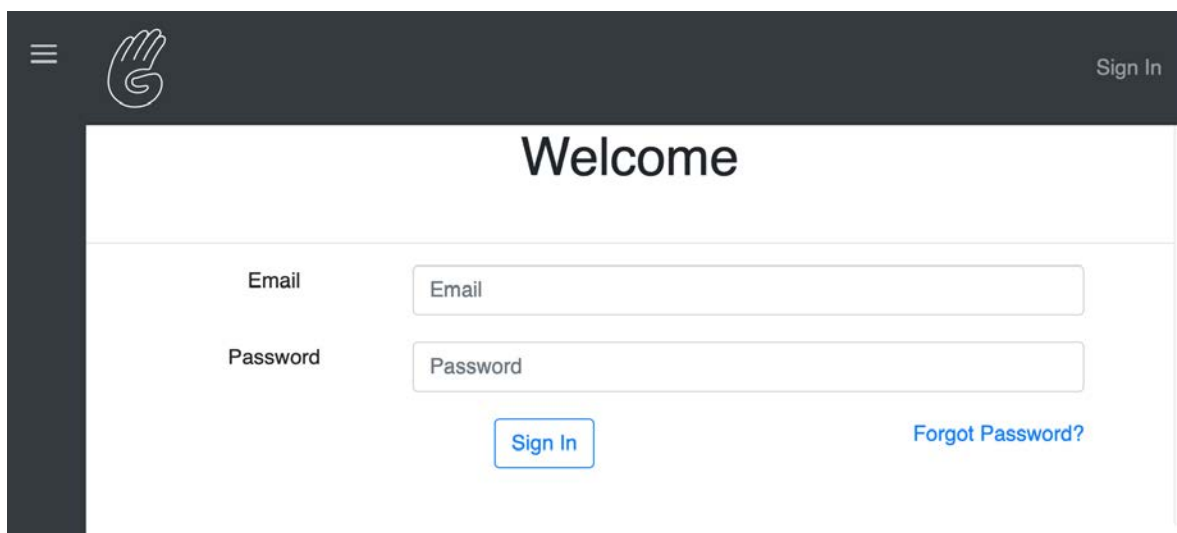


The owners of the community can now *export the data* related to its members as a csv file and the organizers of an event can do the same for their participants. Only National Expert Center representatives (NECs) and ambassadors can create events in the Go-Lab community and hence download the associated data. They have been informed of their personal responsibilities to enforce privacy, comply with the participant's consent, and keep such files in a secure place and private place.

Features envisioned to *extend search and recommendation* of teachers based on similarities in their profile and activities were not implemented not to violate the rights for privacy of the users. In addition, most of the co-creation and exploitation activities are carried out in private spaces, which would have resulted in poor performance of a recommendation system relying only on public resources to identify similarities.

Additional features to *ease navigation* within the community spaces, as well as between home and community spaces will be considered for implementation during the last year of the project.

Finally, features supporting the analysis of the community will be integrated progressively in the new Graasp impact dashboard associated with T1.4 (Fig. 3). This dashboard is a dedicated Web application and has an access restricted to NECs and ambassadors which can only see the analytics of their own country. It exploits anonymous google analytics, Graasp interaction traces, as well as information provided by community members when they fill the registration form.



**Figure 3. Login page of the new impact dashboard application.**

As of December 1st, 2017, 1083 users from 47 countries across the world had registered to the Go-Lab community. One year later this number has more than doubled with 2'741 members.

Table A and B show the evolution of the community in terms of teaching level and discipline, respectively.

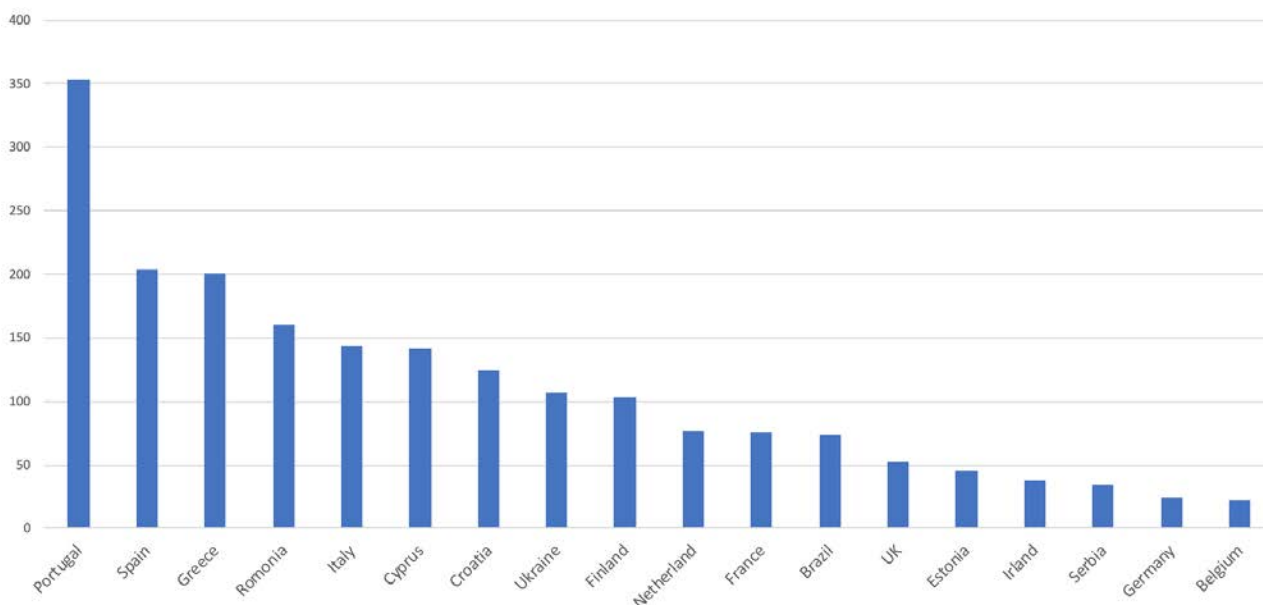
**Table A. Evolution of the Go-Lab community in terms of teaching level after one year (December 1st, 2017) and two years (December 7, 2018). Note: A single user may teach at different levels.**

	Primary	Lower secondary	Higher secondary	Higher education	other	Not applicable
Dec. 2017	251	323	406	212	135	121
Dec. 2018	732	811	964	486	289	310

**Table B. Evolution of the Go-Lab community in term of teaching discipline after one year (December 1st, 2017) and two years (December 7, 2018). Note: A single user may teach at different disciplines.**

	Chemistry	Computer science	Engineering	Integrated science	Math	Physics	Other	Not applicable
Dec. 2017	305	188	106	219	348	436	419	60
Dec. 2018	698	472	256	608	773	924	1064	199

**Figure 4 shows the number of registered members for the major countries.**



**Figure 4. Representation of Go-Lab community per country. Only countries with more than 20 registered users have been included.**

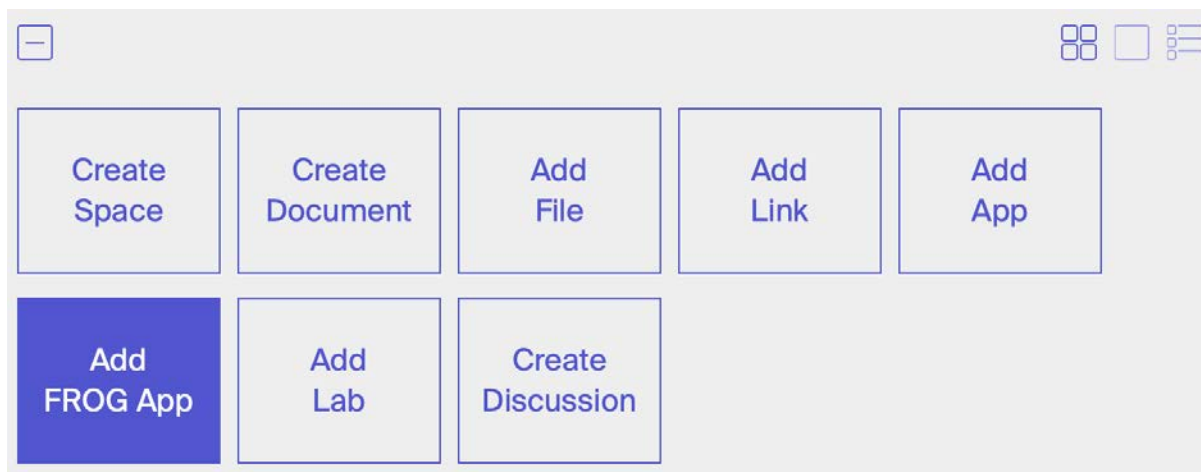
### 3. Creation and personalization services for teachers

The main features related to creation and personalization envisioned in D2.3 are listed below and their implementation status detailed.

*Extend user profile with public/published ILSs:* A way to do this during the third year of the project will be to enable the creator to pin a given space to be displayed in his or her public profile, and possibly also to be indexed in google to bring additional traffic in the ecosystem.

*Improve content-based recommendation algorithm.* Users look more for content on the cloud or on golabz than in Graasp. So, we might remove regular content recommendation in Graasp as most of it is in private spaces. Alternatively, we might only keep recommendation of content with a very high degree of similarity. Recommendation of support apps in the various inquiry learning phases will be kept.

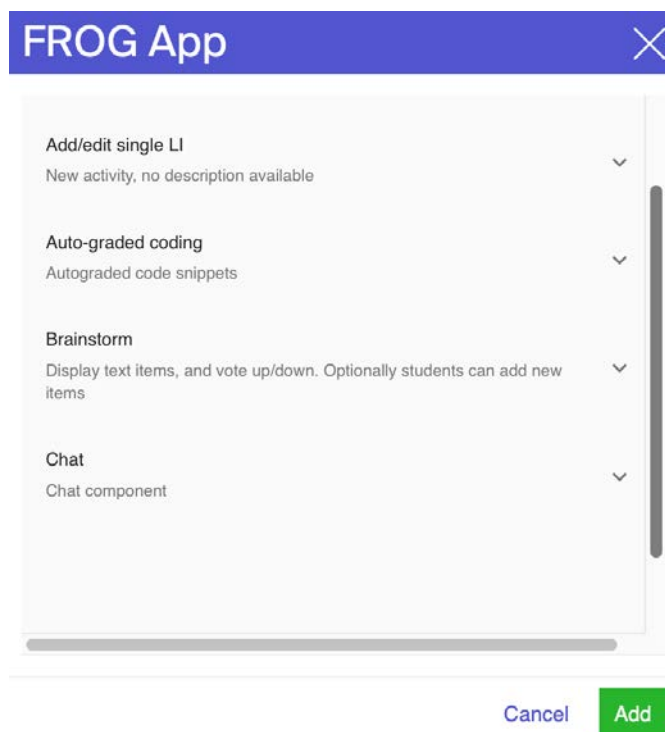
*Integration of new multimedia resources.* The support for open source FROG<sup>1</sup> apps has been added, currently still as a hidden feature for further testing before delivering it to end users (Fig. 5). The general strategy to enable integration of additional apps and labs has been presented at the GIREP conference<sup>2</sup>. The FROG apps can be selected from a list (Fig. 6) and are hosted in the graasp.eu domain. The configuration of the FROG apps is done through a dialog when added in an ILS. Moreover, thanks to the new Graasp API presented in D4.4, any interactive Web page can be added as an iFrame in a space just by adding its link. Apps no longer need to be wrapped as an open social app.



**Figure 5. Dialog to add a FROG app in a learning space (displayed with CTRL+SHIFT+F)**

<sup>1</sup> <https://github.com/chili-epfl/FROG/wiki>

<sup>2</sup> Juan Carlos FARAH and Denis GILLET, Encapsulating Online Labs in Structured Learning Spaces, Research and Innovation in Physics Education Conference, 9th - 13th July 2018, San Sebastian, Spain



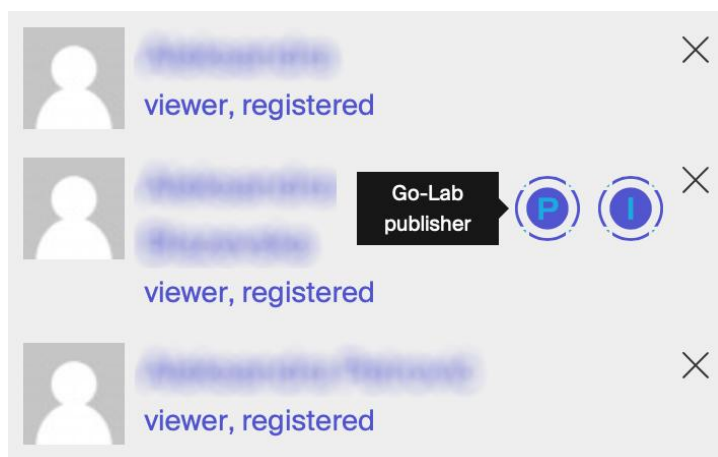
**Figure 6. List of FROG apps currently available as displayed when the “Add FROG App” button is clicked (after selecting an app, its configuration panel appears)**

*New languages added on demand.* As of December 7, 2018, 27 languages are available in Graasp and others can be added on demand through a dedicated dialog bringing the users to the semi-automatic translation service (<http://composer.golabz.eu/translator>). In addition, support for languages having variations (such as simplified and traditional Chinese) have been added in both the Graasp platform and the translator service (See D4.4. for details on internationalization).

*Explore storage and verification solutions for learning artifacts and activity traces, as well as explore archiving solutions for learning content and activity traces.* Further investigations have been carried out to design an alternative architecture to archive and guarantee the authenticity and the integrity of the learning outcome and interaction traces for learning applications beyond formative inquiry learning. The current status of these investigations has been presented at the IEEE ICALT conference<sup>3</sup> and well received by the digital education community. Its actual implementation would require a new dedicated project.

*Badge visualization:* A process to assign badges has been devised through participatory design. It relies on the exploitation of the impact dashboard by NECs and ambassadors. Once teachers eligible to receive a badge have been identified, their names are communicated to the Graasp platform managers and badges are added manually. The badges icons designed collaboratively by the partners managing the community, are displayed next to the name of the nominees in the community member list (Fig. 7). During the 3rd year of the project, golabz will be exploited as a platform to confirm the authenticity of a badge.

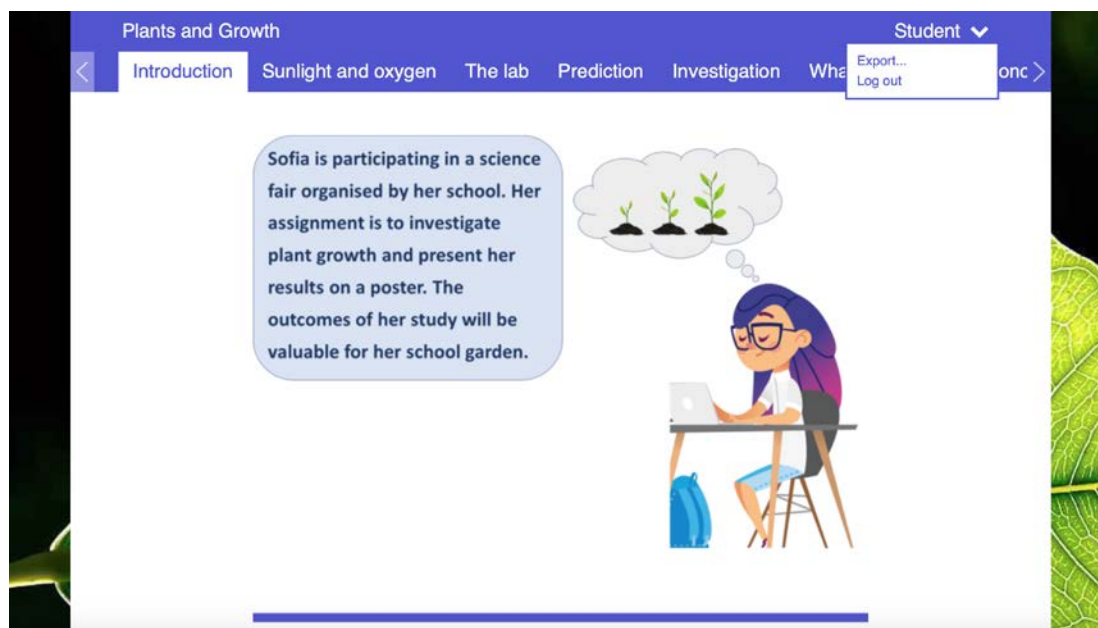
<sup>3</sup> JC Farah, A Vozniuk, MJ Rodríguez-Triana, D Gillet, A Blueprint for a Blockchain-Based Architecture to Power a Distributed Network of Tamper-Evident Learning Trace Repositories, 18th IEEE International Conference on Advanced Learning Technologies, Mumbai, India, July 9th - 13th, 2018.



**Fig. 7. List of badges assigned to a teacher having published ILS on Golabz (Badge P) and having implemented ILS with students (Badge I)**

Badges currently available are for *publishers*, i.e. teachers having openly shared at least one ILS on the golabz.eu platform, and *implementers*, i.e. teachers having actually used at least one of their ILS with more than 5 standalone users. Badges for Ambassadors, co-creators, as well as experts are also considered.

*Export of any inquiry learning space as an eBook* (Fig. 8) has been implemented and the generation of a *pdf copy* of its content has been improved for handling in a better way the response time of the various apps in the generation process. The export format is selected through the dialog displayed in Fig. 9. This feature completes the ePortfolio scheme offered to students by enabling them to export in a single document their ILS. The generated eBook combines the resources gathered by the teachers in the various inquiry learning phases, the learning outcome of the students themselves displayed as state of the various apps, as well as, if selected, their learning traces displayed in the student learning analytics dashboard (Fig. 10). Pop-up windows should be enabled in the Browser to complete the eBook generation.



**Fig. 8. Export feature available to students in the standalone view (top right corner).**

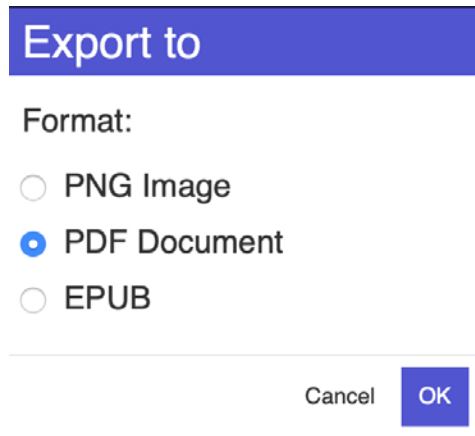


Fig. 9. Export dialog to select the preferred output format (EPUB is the standard eBook format).

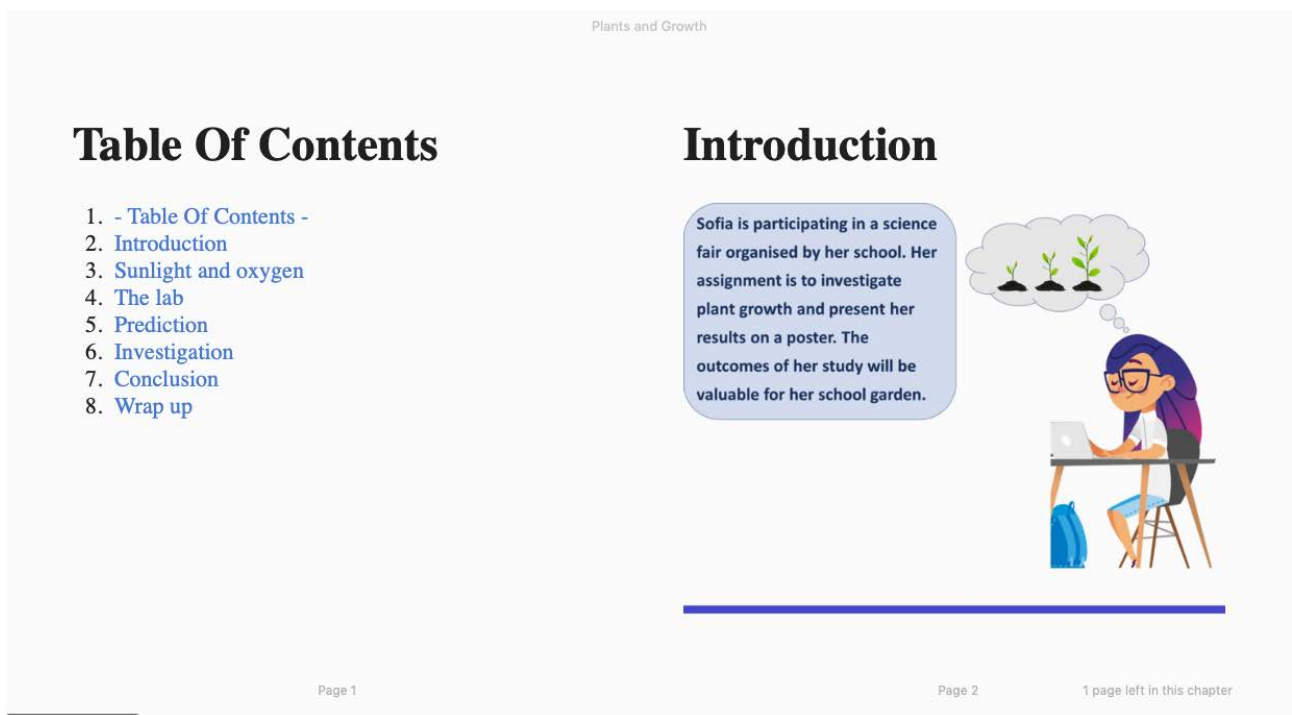


Fig.10. Table of Content and first pages of the eBook generated (each inquiry learning phase is turned into a Chapter)

*Welcome tour.* Last but not least, an animated welcome tour (Fig. 11) is now enabled and made visible during the first visit of a new registered teacher in Graasp. This feature reduces the friction for users during their first contact to the platform and introduces the basic mechanisms to create a learning space and add content to it. The tour can be disabled or enabled in the setting tab of the user profile (Fig 12).

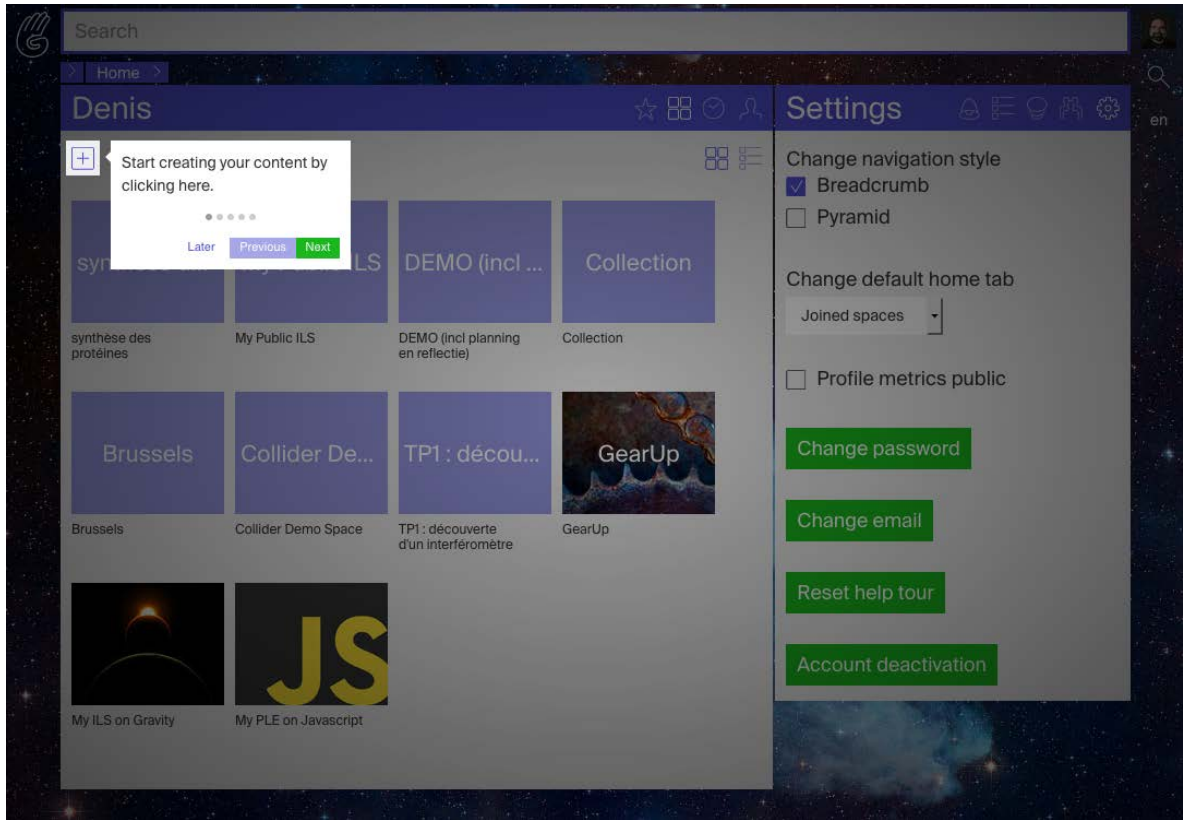


Fig.11. Tooltip displayed as part of the welcome tour during the first Graasp visit (by clicking on next, another tooltip is displayed).

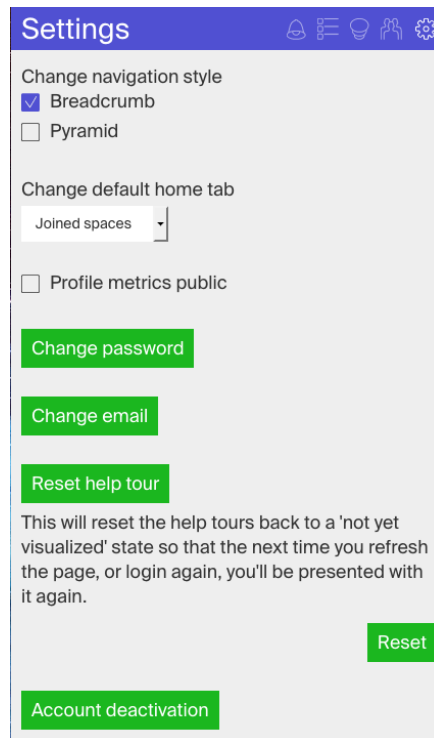
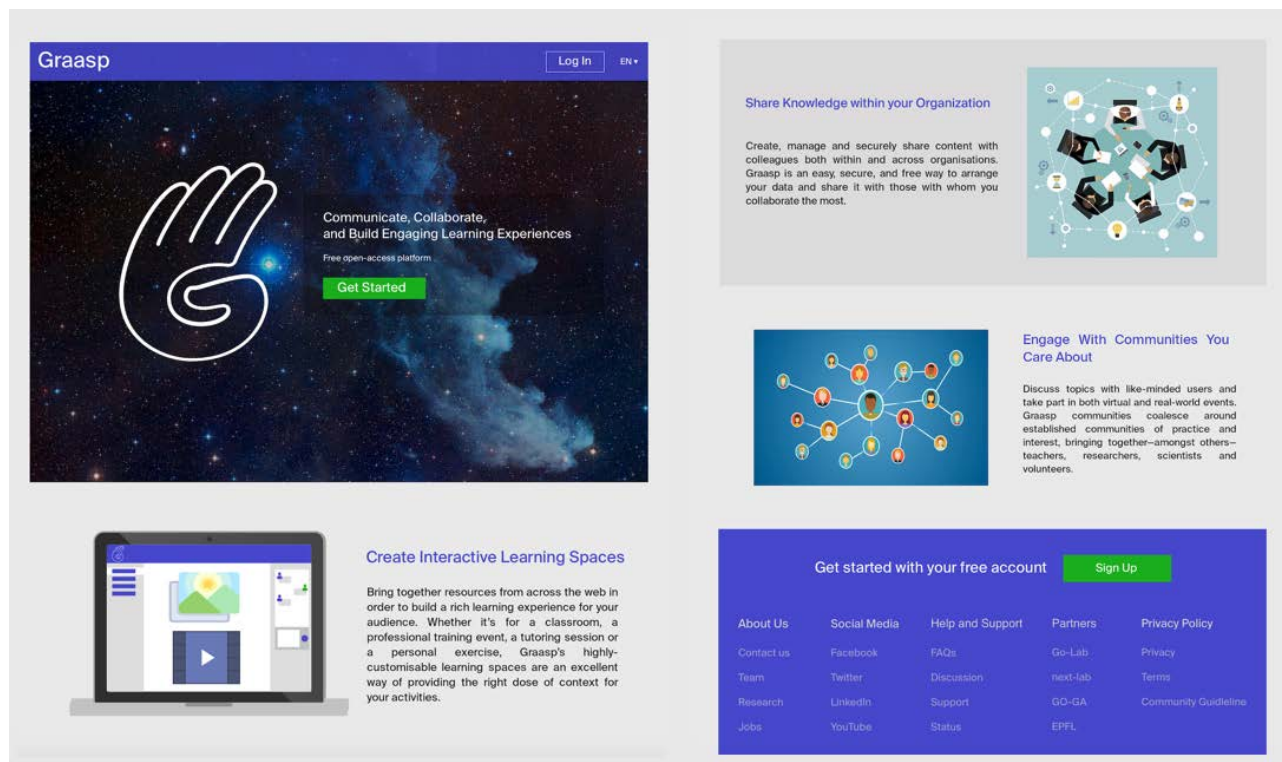


Fig.12. Enabling / disabling preferences for the welcome tour (*Reset help tour* button).

A new *landing page* will also be implemented during the last year of the project to further ease the first contact with the platform (Fig. 13).



**Fig.13. Current mockup of the upcoming Graasp landing page.**

#### 4. Awareness, assessment and reflection solutions for teachers

The main focus of the second year was to implement before May 25, 2018 all the requirements imposed by the new General Data Protection regulation (GDPR). All the related changes have already been presented at the project intermediary review in 2018. The detailed information will be presented in a scientific publication as suggested during the review.

Additional work on awareness, assessment and reflection solutions for teachers has also focused on replacing old and implementing new Learning Analytics apps. These apps now also integrate what we call a graceful degradation scheme, i.e., they behave nicely (by presenting a message with recommendations rather than crashing), whether AngeLA (tracking) is active or not (<https://www.golabz.eu/apps?category=1195>).

In Graasp, the main scheme implemented to enforce GDPR while supporting awareness, assessment and reflection has been to make the activation of AngeLA by teachers explicit. Activity tracking can be enabled or disabled in the preference pane of a space or by inviting or removing AngeLA from the list of members at any time. The fact that tracking is disabled by default has resulted in a significant reduction of the usage of Learning Analytics by the teachers from 93 to 46% as reported during the intermediary review (fig. 14). More promotion of the LA features and benefits have now to be integrated in training and dissemination activities.



ILSs containing AngeLA (total)	Number of ILSs (total)	ILSs containing AngeLA before opt in	Number of ILSs before opti in	ILSs containing AngeLA after opt in	Number of ILSs after opt in
2710	3258	2386	2560	324	698
	83.18%		93.20%		46.42%

**Fig.14. Evolution of the percentage of ILS with tracking enabled (AngeLA) before and after opt-in was enforced.**

During the last year of the project, we will refine the Kibana dashboard that is showing the co-creation activities within the Graasp authoring view. This dashboard is displayed when the owner of a space selects the pie chart icon located at the right end of the title bar of the space. Besides, problems related to identifying the actual location of people has been fixed.

### 5. Page view

An alternative standalone view is now implemented and available for testing in the Graasp sharing table of inquiry learning spaces, as well as in regular spaces. This alternative called Page View (as it is offering a single Web page view of space structure and content) relies on the new Graasp API and support new apps independent of the old open social standard and the depreciated shindig server. As a matter of fact, the Page View is an independent Web application better enforcing best implementation practice by app providers and better security in the exchange of information between apps and their embedding spaces.

Compared to the former standalone view, the Page View (Fig. 15) was also redesigned to better support scrolling and longer name for the inquiry learning phases. The navigation between phases is now available on the left-hand side rather than on the top of the ILS, and tools, if any, are displayed on the right-hand side and always visible. The display of learning phases can be toggled using the new hamburger-like button on the top left corner of the view. The general description wiki is not continuously displayed anymore. It is accessible using the little info button. Last but not least, all the screen is now exploited to display the content and the background image which was slowing down loading is now removed. The resizing of the browser window on both desktop and laptop computers has been improved, as well as on tablets and smartphones. The design is also aligned with the mobile app currently developed in the Go-Ga project to enable offline viewing of inquiry learning spaces on mobile devices and to provide a consistent user experience.

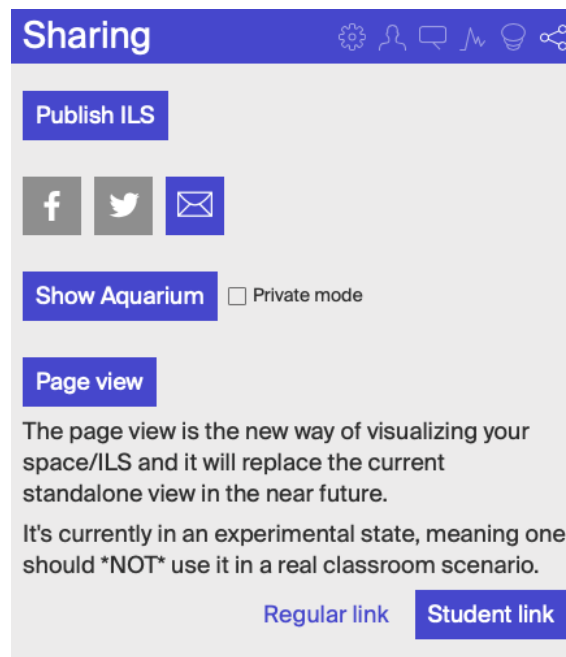
Therefore, the new Page View is simultaneously a new more efficient and reliable technology and a new way of supporting user interaction.

Before fully replacing the current standalone view, some further testing of the new Page View is needed with existing learning spaces. The export popup up menu for pdf and eBook generation should be implemented, as well as internationalization.



**Fig. 15. The new Page View off an ILS on Plants and Growth.**

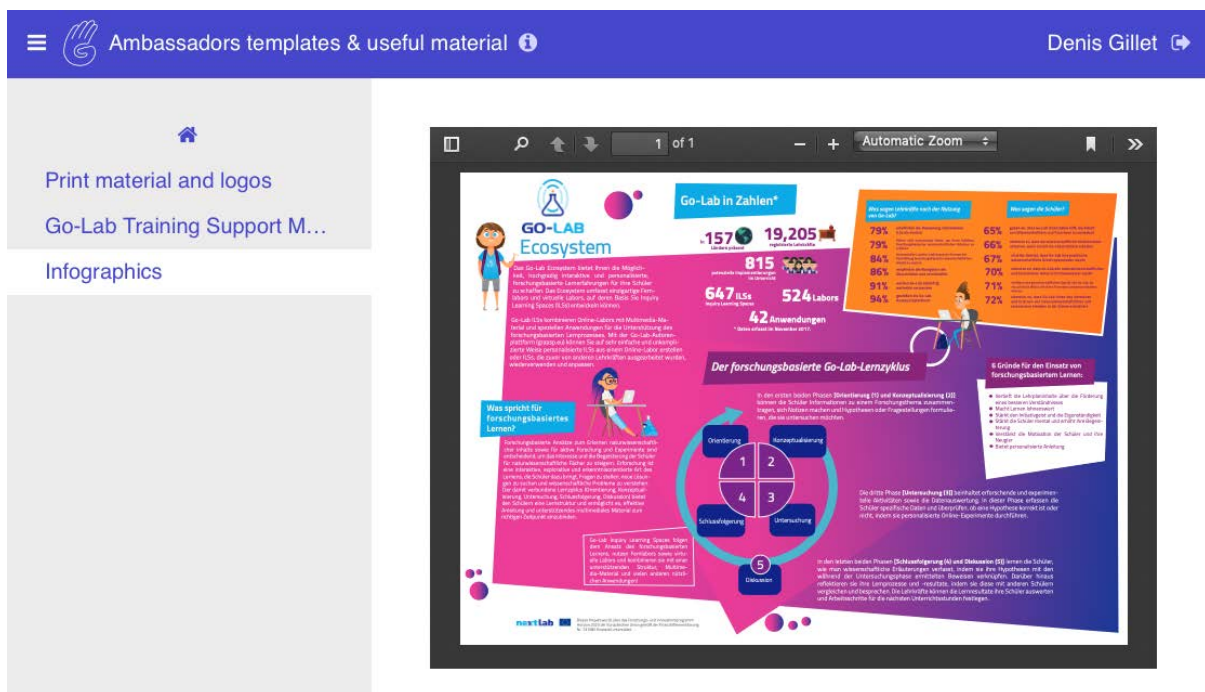
When selecting to display the Page View in the sharing tab, two options are offered: Regular link and Student link (Fig. 16). The regular link is providing the view for the currently logged user, typically the teacher. This is useful not to create a new standalone user for pre-visualization during the co-creation process. As indicated by its name, the proposed student link is for students and require the user to provide a nickname.



**Fig. 16. Part of the sharing tab showing the Page View display options.**

A very important feature of the Page View and the new apps is that they do not rely anymore on data stored in the invisible vault subspace, which has always been a source of trouble and wrong actions by the users. Learning output and app settings are now directly stored in the Graasp database through the new Graasp API. This is speeding up loading time.

The Page View is also available for regular spaces (Fig. 16), like for an event space in the Go-Lab community. In this case, there is no alternative view as standalone users are not supported in regular space. Currently, only one level of the space hierarchy is displayed and a home button enables to display the content of the root space. However, the Page View can be activated at any level of a space hierarchy, offering many options of publishing space or subspace content to authorized people.



**Fig. 17. Page View of a regular space with subspaces displayed on the navigation pane on the left-hand side.**

Preliminary feedback gathered from project partners and a first participator design evaluation by carried out by University of Leicester are very positive and let foreseen an easy adoption by the teachers and students.

## 6. Other improvements

More than 20 other improvements have been implemented, not counting bug fixes. They were all resulting from users or partners requests (participatory design activities, training events, or intercom support chats) and are listed below.

- The option to share a space on Google+ has been removed as this platform has been decommissioned by Google.
- A standalone view can now be integrated in Google Classroom in one click thank to a button offered next to the standalone view link.
- FROG apps are now offered to teachers to further personalize their learning spaces with additional support and interaction apps.
- The Graasp UI is now also translated in Czech, Slovenian, Serbian, Lithuanian, traditional Chinese, Japanese, as well as in Swahili, the latter being to support the users from Africa associated with the Go-Ga project.
- The aquarium view supporting gamification of co-creation is now offered to all users. Previously, it was only shown to randomly selected users for A/B test regarding the potential impact of this feature.
- The user can now select the preferred view when they log into Graasp; typically, the favorite or the home view. This is especially useful for users having a home space with many sub-spaces and inquiry learning spaces.
- A short link is now automatically generated for all standalone views, making easier for teachers to share a space with their students or colleagues.
- On links embedded in a space, there is now a chain icon redirecting the user directly to the original location of the page.
- To enforce GDPR, users are now prompted to opt or not for activity tracking when copying an ILS.
- The vault content and standalone users are not copied when copying an ILS to better enforce privacy and avoid mistakes. This, however, requires the teachers to zip or keep the original ILS for archiving purpose after a class is completed.
- User can now change their email address in their profile. This is especially important when users change institution and loose their current professional email address. They can add their new one in their profile and still keep access to all their spaces. This is also useful for users working with many different email addresses.
- Standalone users can now be removed from the member list of a space. This is useful when teachers create temporary standalone users for testing purpose, or to reuse a learning space with another group of students. This useful feature will, however, have an impact on the project analytics in terms of standalone users.
- To better support the usage of Graasp as an archiving (ePortfolio) platform, the zip archive created now also include the space and subspaces descriptions. It also useful for exploiting zip archive for backup at different stages of co-creation (we had a few cases of co-creators deleting by mistake a space).
- The legacy Go-Lab repository of activity traces located in Duisburg have been decommissioned as part of the compliance adaptation to GDPR at the end of March 2018.
- The BTSync peer-to-peer synchronization of spaces for off-line exploitation has been decommissioned after the first year of experimentation and validation. A better and more sustainable approach to off-line usage of learning spaces is now developed in the framework of the Go-Ga project. The provider of the BTSync clients was constantly modifying its business conditions, putting the sustainability of this feature at risk.

- Previously, standalone views protected by both a nickname and a password could not be reviewed by teachers. Now it is possible.
- Now, when searching for a user, a popup menu enables to either look at the profile of the selected person or directly invite him or her in a given space.
- The communication between Graasp and golabz when publishing an ILS or between golabz and Graasp when copying a published ILS is done through HTTPS for security reasons.
- The invitation and discussion emails sent from Graasp to users are now encrypted.
- Previously, members of a space with editor rights could add documents but not remove them. This was a bit inconsistent with the way people would handle their contributions. So, now, any editor can remove the items they have added. Owners can still remove items added by any member of their space.

## **7. Conclusion and outlook**

During the first year of the project, there has been a special emphasis on supporting NECs and Go-Lab Ambassadors at the community level, while preserving the data privacy of the teachers and enabling the systematic data gathering and analyses.

During the second year, the focus has been on enforcing GDPR and on facilitating co-creation of learning spaces by teachers, including simplifying the interplay between the new implementation of golabz.eu and graasp.eu while publishing or copying learning spaces. The ePortfolio features have also been enhanced and support the creation of eBooks as well as a pdf generation more robust to app behaviour, especially loading time and content display.

Last but not least, a new standalone view called Page View enables now to support new apps relying on the new Graasp API introduced in D4.4 and not relying on the depreciated shindig server. The ecosystem is now easier to use and more sustainable in terms of technologies used.