

# Looking for a platform that can be proposed to students as a PLE enabler

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**Abstract**—The booming development of informal learning resources such as those available online in the Web 2.0 ecosystem, the generalization of learning methods centred on the students in institutions and the emergence in higher education of new models of learning platforms, such as Personal Learning Environment (PLE), in parallel to the now traditional Learning Management Systems (LMS) question the education institutions on the support and technological resources they can provide to their students to support them in this new and challenging context. A solution could be a PLE enabler that provides a framework to help students building their own PLE and bridges formal and informal learning activities. In this paper we describe a comparative study of two PLE environments in order to understand 1) what are the core characteristics, components and/or functions of a PLE enabler and 2) why a student will transform, or not, a PLE enabler into his own PLE.

*PLE, learning platform, Higher Education, characteristics, components, acceptance*

## I. INTRODUCTION

Learning Management Systems (LMSs) are nowadays commonly deployed in higher education institutions. In comparison, the concept of Personal Learning Environments (PLEs) is recent and its place in such institutions is not completely understood. Higher education institutions must in particular question how they can support learners in developing their own PLE.

In [1], a PLE is defined as “a set of the different applications, services and various other types of learning resources gathered from different contexts. It is constructed by an individual and used in everyday life for learning.” A PLE is expected to offer a continuum from formal to informal learning. The proposed definition is completed with an analysis of the role of the PLE in the learning process. Three main aspects are identified:

- Promoting and supporting self-direction and reflexivity,
- Bridging personal and collective learning,
- Accompanying and allowing the transfer of control and ownership from the institution to the learner.

For the authors of [1], it is therefore essential that educational institutions question how they can support and assist learners in designing and building their own PLE. The resulting assistive institutional resources should:

- Provide metacognitive resources,

- Bridge individual and collective learning,
- Connect with institutional resources.

The technology of PLE is still heavily discussed. Should it be a dedicated application or a personal selection and combination or mashup of technology components [1], [2]? A PLE can be described as a modular, personal and personalized platform that merges various formal university services with the external services that the learner uses informally in his/her personal life for learning activities [3]. The services can be tailored to the learner according to his/her profile, activities and aims. The learner is also enabled to control and trigger the individualization of the platform behaviour. The core components of the PLE environment are the platform and the tools; the community and the resources [4]. Various frameworks for PLEs have been investigated [5], [6]. When connecting PLE with institutional resources, an issue is to help teachers to train learners building their PLE [1]. For this purpose, various experiments have investigated dedicated environments, usually called institutional PLE or iPLE [6]-[9]. They offer a specific environment that teachers can use to interconnect institutional and external learning resources. These environments can be considered as PLE enablers [8] or PLE aggregators [9]. In this perspective, the current central aim of the authors is to understand 1) what are the core characteristics, components and/or functions of a PLE enabler and 2) why a student will transform, or not, a PLE enabler into his own PLE.

## II. PROBLEMATICS

For this study, two instances of a PLE enabler have been developed and evaluated in a formal learning activity with the same pedagogical scenario. Each instance relies on a given platform. Both instances have been designed according to the contextual space model. This model proposes a formalization that unifies its implementation and its uses.

### A. The contextual space model

The contextual space concept formalizes the components of a PLE from the technical viewpoint and describes it as an aggregation unit that is meaningful for both learners and Web platforms [10], [11]. In the space model, a learning activity is conceptually represented by a shared space that integrates people, resources and applications as well as sub-spaces (for sub-activities). This space materializes the learner's context and aggregates all what is required to fulfil

the common goal of the activity. People produce and share resources with applications inside the space. The learners' actions and interactions define the space activities.

### B. Two instances of a PLE enabler

Two different instances of an institutional PLE enabler have been evaluated: Elgg [12] and Graasp [13].

Elgg is a social networking framework. It is an open source project. It includes out-of-the-box the required features to setup and run a social networking site. It brings user management and administration, social networking, cross-site tagging, access control lists, internationalisation support, adaptive display (e.g. laptops, tablets, and smartphones), a template engine and a widget framework. These standard features can be extended with the plugin ecosystem developed and maintained by the Elgg developers' community: blogs, bookmarks, forums, quizzes... Finally, the Elgg API allows developing one's own plugin and integrating specific features.

Graasp is a social media platform dedicated to knowledge management and learning. It has been developed as a proof of concept of the contextual space model. It is not extensible as such (no API is available) but new features can be added by integrating new applications as widgets. Graasp offers a basic standard set of social features: user management, access and privacy control, notifications, comments, feeds, tags, ratings, and recommendations.

It also includes a bookmarklet mechanism to capture external resources, which is more sophisticated than the one available in Elgg. It automatically extracts the embedding HTML code snippet from most of the main commercial social sharing platforms such as YouTube in order to appropriately integrate and display the embedded content. Graasp introduces a strong emphasis on recommendation (for resources, applications, people or spaces) with a sophisticated relation-based recommendation model.

The choice for the two selected platforms for the current study was made according to the three following criteria:

- The platforms need to have the required features to support the implementation of the contextual space model.
- The platforms need to have the same or similar ground features so that it is possible to implement learning environments following the contextual space model and providing the same or similar functionalities to the learners and teachers.
- The platforms need to have radically different layouts and user interfaces to provide different user experiences to the learners and teachers.

Graasp and Elgg cover all these criteria. Regarding the user interfaces, Elgg allows a rather standard user interface layout like well known social networks (e.g. Facebook or LinkedIn) whereas Graasp provides a rather disruptive user interface looking more like a personalized dashboard aggregator and publishing platform (e.g. Netvibes or formerly iGoogle). They show similar objectives but different designs/strategies. Both allow developing the contextual space model described above. They do not include any role or privilege framework (ensuring equality

between all users). Table 1 reviews the main differences between both platforms.

### C. The pedagogical scenario

Our study has been conducted within the course "multimedia services and technology" (University of Geneva). This is a bachelor 1st year course for Information Systems and mainly Business management students. The class size ranges between 120 to 160 students. Students are organized in project groups of three or four members.

The objective is to develop a multimedia content sharing platform, mainly based on image/photos, by using Drupal Gardens, a commercial online prototyping framework based on the Drupal Content Management System.

This whole project is organized in six successive activities where students are guided with global presentations (integrated video demos and guidelines stored on SlideShare and YouTube) to produce intermediate incremental results. We call PPCM these presentations-resources.

The official LMS (Dokeos) is used to provide course contents mainly as downloadable slideshows. In combination, a global space for the whole class is created in the PLE enabler (aggregate and share all the learning resources). Sub-spaces corresponding to project groups are organized inside the main space. Students have to use the different features to describe, comment and document each project activity. Only the two first activities that are analysed in the study:

- Activity 1: Students have to understand how multimedia sharing platforms are working (Wiki Commons, 500px or Flickr). Their activity is to take photography and submit it into the University photographic library. Then, with a mind map, they must describe and analyse the tasks and the metadata involved in the photographic library. Students use a commercial online mind map service and have to edit their map, publish it and then embed it in their project space.
- Activity 2: Students have to understand what is a Content Management System and get the basics for Drupal. As an activity, they have to create an account on Drupal Gardens and start to prototype the look and feel of their platform prototype with the integrated theme editor. Finally, they have to submit the URL, the metadata they have selected for the photos and the description of their prototype platform in their project space.

## III. CASE STUDY

### A. Focus and population of the study

We have used the same pedagogical scenario, the same contents, learning material and tools except for the PLE enabler: Graasp (2012) and Elgg (2013) which play exactly the same role in both experiments. We evaluated only Activities 1 and 2. In the current article, we focus on the analysis of the 2013 course population and then compare with those obtained with the 2012 students [14].

In 2013, 54 students answered the questionnaire (2012: 71 answers). In 2013, there are 20 girls and 30 men (and 4 students did not answer this question). The average age is 22 years old (youngest: 18; oldest: 30). The majority of the students (44) follow a Business Management curriculum. 7 have Information Systems as their major domain. 3 students did not answer. Globally, the 2013 and 2012 populations are similar: same curriculum, good familiarity with computer and ICT use. Then, it is possible to compare the results of the two populations.

### B. Methodological aspects

We want to analyse how far a platform is perceived as a PLE enabler. We proceeded into two phases. First, we proposed students to work, with the help of a platform and of other resources and tools, in the real conditions of a collaborative learning activity developing during a BA course (one semester). Second, with a questionnaire given at the end of the course, we evaluated the acceptance of the students about the platform and the other tools and resources to be used during the activity. The acceptance of the students is evaluated and also their perception of the usability and utility of the tools on the basis of two models [15] [16].

Tricot and his colleagues [15] showed that one can evaluate the global perception which students have of a learning environment by evaluating the quantity of use of the different components of this environment (acceptance), linked to the usage easiness of the tools (usability) and linked to the usefulness of the tools for performing the learning activity (utility). A pedagogical scenario implies some logic in the use of the different tools and resources of a course environment. A tool should have a high acceptance if it is a main element of the scenario. Acceptance reflects then the understanding of the learning scenario. Also the acceptance of a tool should be even higher if it is easy to use (usability) and if it really helps to perform the task (utility). To precise the utility perception of tools, we use the model of Lebrun [16] and its five utility functions for the components of a learning environment: motivation, information, activation, interaction and production. With these elements in our questionnaire, we evaluate how much the platform is perceived by the students as a PLE enabler during the course, and also how easily and efficiently.

We aim to evaluate also if the students want to adopt the platform, as their own PLE enabler, outside the context of the course and during future personal learning activities. Therefore we ask students if they envisage to use the Elgg platform for one of its fundamental functions in the future: to join a space opened by a colleague, to open a space and invite colleagues, to appropriate themselves elements from spaces of other persons, to aggregate Internet sites and documents perceived as useful.

## IV. RESULTS OF THE STUDY

### A. Results of the 2013 course

In activity 2, the platforms Elgg, Dokeos and Drupal Gardens have a very high acceptance. The presentation tools

PPCM1 and 2 seem to be more accepted than in the first activity. The photographic library has a low acceptance.

Dokeos has a very good usability: 35/54 students answered that it is very easy to use. Elgg (22/54 answers with levels 5 or 6) and PPCM (27/54 and 28/54 answers with levels 5 or 6) seem to have a good usability. The photographic library is easier to use in Activity 2. In respect to utility, Elgg (35/54 answers with levels 5 or 6) and PPCM (35/54 and 39/54 answers with levels 5 or 6) seem to be very useful in Activity 2. Dokeos stays very useful: 35/54 students evaluated its utility with levels 5 or 6. In contrast, the photographic library isn't considered useful (34/54 answers with levels 1 or 2).

Concerning the model of Lebrun, 25/54 students see the learning environment motivation function in Drupal Gardens. Information function is shared between Dokeos (40/54), Elgg (39/54), PPCM (38/54). Activation function is mostly perceived in Drupal Gardens (27/54) and also by Dokeos (18/54), PPCM (18/54) and Elgg (17/54). Interaction function is shared between Elgg (25/54) and Drupal Gardens (20/54). Production function is perceived in Drupal Gardens (37/54).

30% of students want to reuse Elgg to "appropriate themselves elements" or to "do list of sites" (in 2012: 11% to "appropriate themselves elements; 23% to do list of sites). It demonstrates a motivation, pretty low, to reuse it in the future. 14 students say they know or use other tools than Elgg, which have the same social function (Facebook, Twitter, Hotmail, Google Plus, Dropbox.). As in 2012, the impact of social function for this platform is confirmed.

### B. Comparison with 2012 course

Figure 2 supports the following comparison:

- Acceptance: Elgg is more accepted than Graasp. We also observed this result in the first activity.
- Usability: Photographic library and PPCM have a lower usability for 2013 students who seem to have more use difficulties than 2012 students. Elgg is easier to use than Graasp. Drupal Gardens and Dokeos are stable.
- Utility: Globally Elgg is evaluated as more useful than Graasp. More precisely:
  - Students link more Elgg, than Graasp, with the Information function;
  - Students link more Elgg, than Graasp, with the Motivation function;
  - Students link less Elgg, than Graasp, with the Production function.

## V. DISCUSSION AND CONCLUSIONS

Our methodological process seems to be validated with the 2013 population: the students' acceptance profile is coherent with the pedagogical scenario and the different tool roles. We obtained the same result already with the 2012 population.

Elgg has been evaluated as an alternative to traditional course management systems for collaboration and peer learning [15]; as social platform in addition to a Virtual Learning Environment [16]; or as a dual virtual learning

space that integrates formal and informal learning [19], [20]. Two evaluations of Graasp are reported in [10] where this platform is used as a collaborative work platform for a group project course and a thematic workshop. Another evaluation where Graasp is used for peer assessment is also reported in [21]. Our results complete these previous ones.

From a usability point of view, Elgg seem to be easier to use than Graasp, for performing the proposed Activities 1 and 2 of the experimented course. Quite sure the conventional interface of Elgg is a main reason for such a result. This is perhaps also why 2013 students give a very high level to the utility of Elgg, very opposite to the utility level of Graasp in 2012. However, both for the 2012 and 2013 populations, not many students said they would adopt Graasp or Elgg as their own PLE, in particular because of other social media platforms that they already know and use.

Then, as a development perspective, another result raises our attention. Students identified at a very high level the Information and Interaction functions for both Elgg and Graasp platforms. Here we link this repeated very positive evaluation to the basic common structure of the two platforms: the model of people, resources and applications. This characteristic appears as very promising to the authors when thinking about a PLE enabler.

## VI. ACKNOWLEDGMENT

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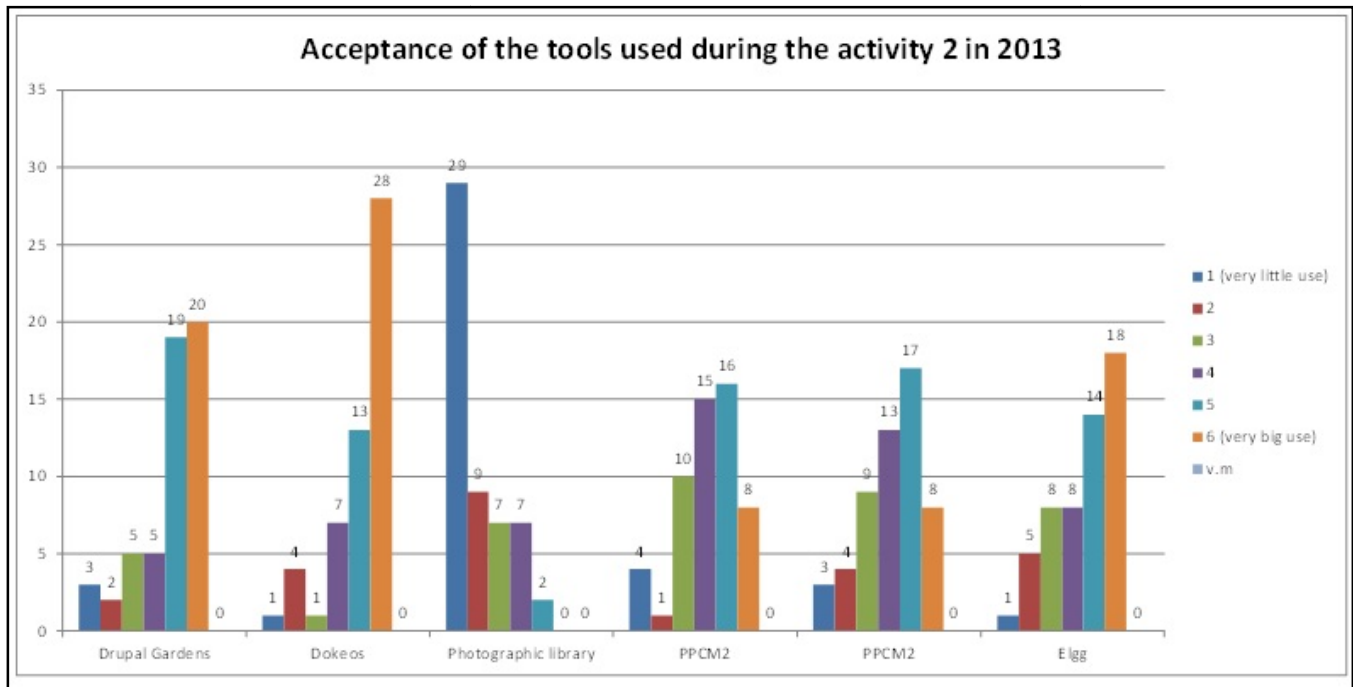


Figure 1. Acceptance of the tools used during the Activity 2 in 2013

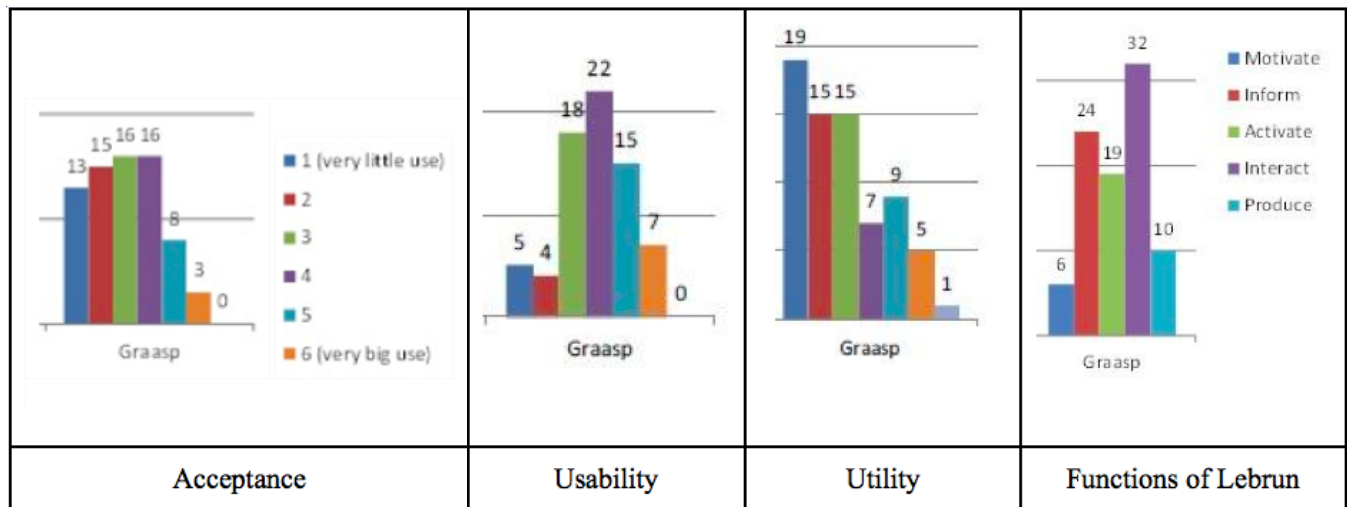


Figure 2. Perception of 2012 students for the Graasp PLE enabler (Activity 2)

TABLE I. REVIEW OF THE MAIN DIFFERENCES BETWEEN GRAASP AND ELGG

Graasp ( <a href="http://grasp.epfl.ch">grasp.epfl.ch</a> )	Elgg ( <a href="http://www.elgg.org">www.elgg.org</a> )
<ul style="list-style-type: none"> <li>- Mash-up social media platform for KM and learning</li> <li>- Social features: users management, access and privacy control, notifications, comments, feeds, tags, ratings, and recommendations.</li> </ul>	<ul style="list-style-type: none"> <li>- Social network engine for general purpose</li> <li>- Social features: user management, profiles and relationships, access control, theming, web services, activity stream, notifications, comments, feeds, tags, ratings, recommendations, microblog</li> </ul>
Disruptive interface compared with conventional social networks (e.g. Facebook or LinkedIn).	“Standard” interface compared with conventional social networks (e.g. Facebook or LinkedIn).
Mainly behaves as an aggregator.	Behaves as an aggregator and a content management system.
<ul style="list-style-type: none"> <li>- Features can be added through widgets.</li> <li>- Advanced bookmarklet mechanism to capture external online resources.</li> </ul>	<ul style="list-style-type: none"> <li>- Features can be added through plugins and widgets.</li> <li>- Basic bookmarklet mechanism to capture external online resources.</li> </ul>
Does not include content types but a default container with thumbnail, description, recommendation, rating and comments that can embed an external resource, a file or a widget for an external application.	Provides different content types: <ul style="list-style-type: none"> <li>- comments, rating, and recommendation features for contents: pages (online production); files (upload and sharing); bookmarks or blog posts.</li> <li>- extension possibilities: forums, quiz, etc.</li> </ul>
Activity-Group spaces are “flat”: all components; people, apps, resources and sub-spaces are presented at the same level and with the same look and feel.	Activity-Group spaces are structured: people, apps and resources are separated. Resources are sorted according to content types.
Does not provide any activity/chronological information.	Provides an activity stream with a chronological overview of all members’ interactions.