

# Personal Learning Environments and Embedded Contextual Spaces as Aggregator of Cloud Resources

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**Abstract**—This paper presents how advanced social media platforms can be exploited as personal learning environments, thanks to the core concept of shared spaces. The usefulness of open plugins to collect resources from the cloud in such dedicated contextual spaces is discussed. The mechanisms for the personalization of spaces from an interaction point of view once populated with resources and their sharing across platforms are also detailed. Results are illustrated with the case of the *Graasp* platform developed in the framework of European research projects.

*Personal Learning Environments (PLE); Social Learning; Creative Commons; Online Shared Spaces; Cloud*

## I. OPENSOCIAL SPACES

A personal learning environment (PLE) is a recent and evolving concept yearly discussed in the framework of the PLE conference<sup>1</sup> and in workshops related to Technology Enhanced Learning (TEL). Enabling technologies are developed in a few research projects and initiatives such as the ROLE European project<sup>2</sup>, which focuses on defining and validating sound pedagogical framework for self-directed and informal learning, as well as sound technical framework for Open Web 2.0 PLE [1]. The investigations in ROLE rely on participatory design and social requirement engineering conducted in academic and professional test beds. Currently, the definition we propose for a PLE is *Any open environment or social media platform combined with interactive devices and exploited by users for learning and knowledge management*. In this definition, *Open* means coming from the cloud in contrast to proprietary institutional resources. *Devices* are mentioned to emphasize the ubiquitous and sometime tangible nature of the resources gathered in a PLE. In addition, when dealing with knowledge artifacts and online communities, there is a blurring distinction between their exploitation for *knowledge management* or *learning*, as the latter often occurs without noticing when practicing the former. The following properties of a PLE can be listed: i) Any digital ecosystem repurposed for learning is a PLE, i.e., it is the intention of use and not the design of the platform which makes it a PLE [2]; ii) Constructing the environment is part of the learning process, i.e. constructionism is finally extended at the level of the environment; iii) PLE are

personal but not individual, they may integrate peers, coaches, teachers or even relatives [3]; iv) Each PLE is designed for a single context or purpose.

Participatory design activities carried out in recent years have demonstrated that, to be complete, a PLE should integrate a contextualizing entity we define as a shared *activity space*, each space integrating itself *people* (members), *resources* (shared digital artifacts), *apps* (tools or applications offered as widgets or OpenSocial gadgets to enable the realizing of contextual actions or visualization), as well as subspaces. As such, a space is the instantiation by an individual of a PLE constructed to support a dedicated learning activity [4]. As a space usually gathers from the cloud people (enabling interaction), resources (enabling knowledge acquisition and consolidation) and apps (enabling environment plasticity), it strongly relies on advanced *search*, *recommendation* and *aggregation* features.

In order to enforce the personal nature of a PLE and to enable its sharing indifferently of user preferences, a space should not be captive of a single platform. As a consequence, we are standardizing<sup>3</sup> this concept in the OpenSocial framework to enable integration and portability between exiting and future OpenSocial containers.

## II. GRAASP: A SOCIAL MEDIA PLATFORM FOR COLLABORATIVE LEARNING ACROSS BOUNDARIES

*Graasp* is a social media platform developed through participatory design in the framework of the Palette and the ROLE European projects to enable the support of communities of practice and the creation of personal learning environments without any intervention from institutions or managers. *Graasp* enables the creation of learning spaces shared between people belonging to different communities and networks. Embedded shared resources are gathered across institutional and corporate boundaries. Unlike dominant social media, *Graasp* enables a fine definition of the audience, as well as the associated rights and roles to ensure trust construction and privacy enforcement. In *Graasp*, people map their personal and shared projects, interests, and activities into public or private contextual spaces integrating invited members, relevant resources and necessary apps which can be tagged and rated. Any space or resource in *Graasp* integrates its own discussion thread to enable contextual interaction. In addition to an innovative

<sup>1</sup> <http://pleconf.org>

<sup>2</sup> <http://www.role-project.eu>

<sup>3</sup> <http://docs.opensocial.org/display/OSD/Space+Proposal>

relation-based recommendation engine, one of the core features of *Graasp* is the *GraaspIt!* bookmarklet which supports an easy aggregation of cloud resources as detailed in the next section.

### III. GRAASPIT! AND CLOUD AGGREGATION API

*GraaspIt!* is a simple JavaScript bookmarklet that can be activated from the browser bookmark bar at any time when surfing the Web (Figure 1). It relies on the embed.ly library which recognizes more than one hundred web sites and enables the integration of their content in one-click as embedded objects in *Graasp* spaces through the *Graasp* clipboard. In addition, the open *Graasp* plugin architecture enables open content providers to add support for their own repositories or platforms. Thanks to this feature and a dedicated plugin, educational OpenSocial gadgets available in the ROLE widget store<sup>4</sup> can be added in one-click to *Graasp*. In the case the content of a Web site is not recognized or supported, a simple snapshot of the Web page is taken, providing in such a ways a combined bookmarking and archiving feature.

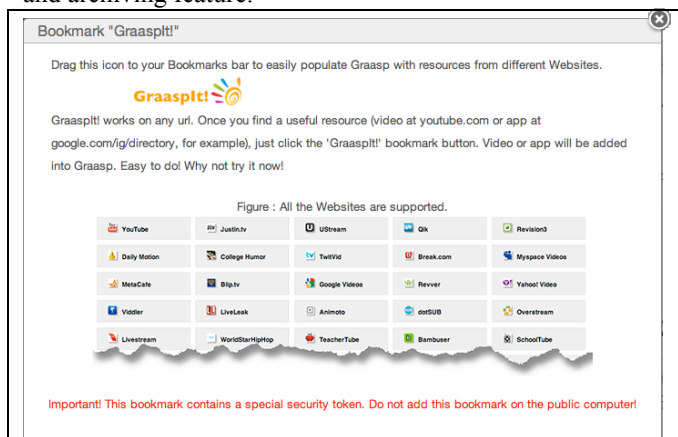


Figure 1. The *GraaspIt!* feature integrated as a bookmark script enabling a one-click gathering of any online resource when surfing the Web.

### IV. SPACE PERSONALIZATION AND SHARING

Once a space is created in *Graasp*, the core part of the interface (the Pad) enabling authorized users to interact with the embedded resources can be further personalized. In addition to the standard view (called the *Graasp* view) provided to populate spaces and to visualize their full content and members (Figure 4), an extension mechanism is introduced to adapt the interaction and visualization mode through functional skins [5]. A functional skin is an XML file with some JavaScript code. It can be created by any user and added in a space at runtime without the intervention of developers. The functional skin feature can be seen as a client-side plug-in. *Graasp* offers two built-in functional skins that can be selected using a popup menu: The Resource view (Figure 2) and the App view (Figure 3). The Resource view displays the list of all resources existing in a space and

provides links for individual or full download. In addition, previews of resources can be displayed. The App view displays and activates all app instances from a space as a mashup. In this view, apps can be resized and their position order can be modified.

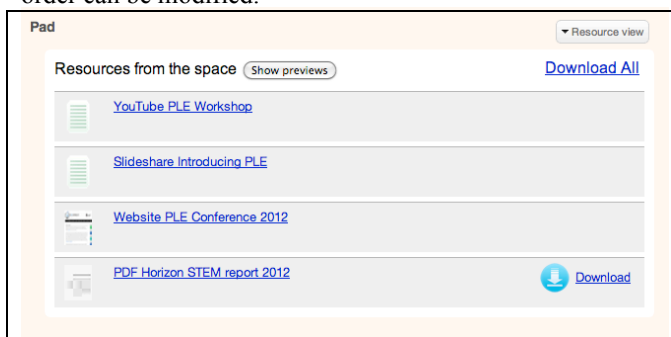


Figure 2. Resource view for a space.

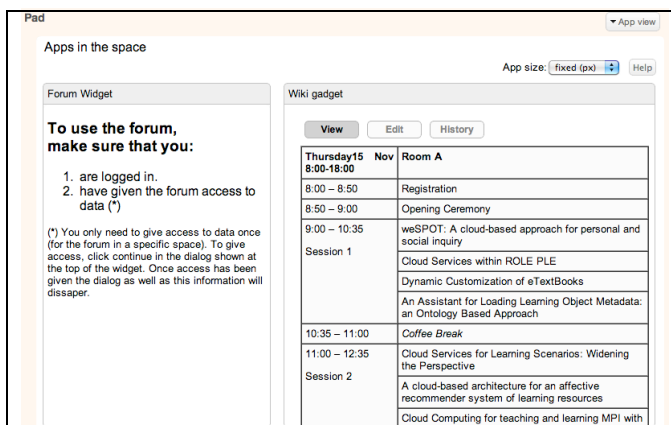


Figure 3. App view for a space.

A space created in *Graasp* can be shared with other people and with other platforms [6]. The space can be extracted from *Graasp* as a private or secret URL. This URL can be shared with other users and open in any browser window. Alternatively, the space can be embedded into another Web environment as an iframe.

In order to facilitate the open sharing of resources and awareness, *Graasp* automatically proposes creative commons<sup>5</sup> licenses when content is made available in public spaces. This mechanism is extendable to code of OpenSocial gadgets when shared publicly to enable the repurposing of apps for personalization to other contexts.

### V. CONCLUDING REMARKS

The usefulness of the space concept and the associated aggregation mechanism to populate them with resources gathered from the cloud have been demonstrated in this paper. Besides, the space personalization providing alternative interaction modes with content and the sharing mechanism have been introduced. The permeability (ability to absorb content from the cloud) and the plasticity (ability to

<sup>4</sup> <http://www.role-widgetstore.eu>

<sup>5</sup> <http://creativecommons.org>

adapt the interaction mode to users' needs and add features through apps) of the spaces introduced in this paper pave the way for personal learning environments [6] fully constructed by the users for the users. Thanks to this agile personalization scheme, the *Graasp* platform introduced in this paper not only enables the instantiation of a PLE, but also enables the creation of dedicated spaces for project management, knowledge sharing or community support.

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Figure 4. Shared contextual space created in *Graasp* and integrating resources gathered from the cloud in one click using *GraaspIt!*, such as YouTube videos, SlideShare presentations, ROLE Widgets, Web pages or pdf documents with previews.