Journal of Universal Computer Science, vol. 19, no. 11 (2013), 1661-1683
submitted: 15/12/12, accepted: 28/5/13, appeared: 1/6/13 © *J.UCS*

TRAILER Project (Tagging, Recognition, Acknowledgment of Informal Learning Experiences)

A Methodology to Make Learners' Informal Learning Activities Visible to the Institutions

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Abstract: The application of information technologies (specially the Internet, Web 2.0 and social tools) make informal learning more visible. This kind of learning is not linked to an institution or a period of time, but it is important enough to be taken into account. On the one hand, learners should be able to communicate to the institutions they are related to, what skills they possess, whether they were achieved in a formal or informal way. On the other hand the companies and educational institutions need to have a deeper knowledge about the competencies of their staff. The TRAILER project provides a methodology supported by a technological framework to facilitate communication about informal learning between businesses, employees and learners. The paper presents the project and some of the work

carried out, an exploratory analysis about how informal learning is considered and the technological framework proposed. Whilst challenges remain in terms of establishing the meaningfulness of technological engagement for employees and businesses, the continuing transformation of the social, technological and educational environment is likely to lead to greater emphasis for the effective exploitation of informal learning.

Keywords: Informal Learning, Service-based framework, Personal Learning Network, Decision Making.
Categories: L.2.0, L.2.1, L.2.2, L.2.3, L.3.0, L.3.6, M.0

1 Introduction

Technological and organizational innovations, and the affordances of the Internet, are facilitating increased access to knowledge and training for individuals that range from formal courses to informal ad hoc learning. However, the greater part of the informal learning that takes place, both within and outside institutional and organizational contexts, remains unacknowledged. Though informal learning has always taken place, the advent of ICT and, particularly, social media approaches, have facilitated these processes and, at the same time, have made them more visible.

Informal learning [García-Peñalvo, et al., 12a], which takes place in the context of everyday experience especially among young and older adults in both Higher Education (HE) and in workplace contexts, emerges from the activity rather than being planned. It is increasingly seen as an aspect of learning that deserves special attention, because of: 1) The recognition that the Bologna process is giving to informal learning [European-Union, 99] as a basic element in lifelong learning; 2) The pressing need to be able to demonstrate learning that in many cases is obtained by observation and experience [Attwell, 07]; and 3) because of the emergence of the Internet, mobile devices and 2.0 Web tools that facilitate such kind of learning [Ajjan and Hartshorne, 08, Casquero, et al., 10, Fielding, 00].

In the workplace the recognition of informal learning is especially relevant because of different factors. Among others [Dale and Bell, 99, Halliday-Wynes and Beddie, 09]: it enhances employability and produces positive benefits for managers and companies; it can develop task skills and knowhow and communicates "social" norms and preferred patterns of behavior; It gives employees the opportunity to learn and keep their skills up-to-date, while being part of the overall workplace culture rather than just its training regime; etc. These issues lead to an interest in informal learning from corporate world, driven by the desire to capitalize on the intellectual assets of the workforce, to manage organizational knowledge and in recognition that informal learning may prove a cost effective way of developing competence [Attwell, 07].

These reasons lead to the definition of several initiatives related to informal learning recognition and validation. For example, the CEDEFOP European Guidelines for validating informal and non-formal learning contain experiences of more than 20 countries in the validation of informal and non-formal learning [CEDEFOP, 09]; the ECOTEC Inventory of validation of non-formal and informal learning provides with a catalogue of good practices in the area of validation for policy-makers [Otero, et al., 05]; the OECD Recognition of informal learning

[Werquin, 10], the ILO International Standard Classification of Occupations, ISCO-88 [ILO, 87] and ISCO-08 [ILO, 08]; are clear examples with regard to the importance of qualifications closely related to skills and competences. There are also several initiatives focused particularly on issues related to the certification and qualification such as: the National Qualification Systems and EQF; MyElvin Social Network for language practice [García-Peñalvo, et al., 12b]; TENCompetence [Berlanga, et al., 08, Schoonenboom, et al., 08]; FREE (Fostering Return to Employment through Entrepreneurship, Innovation and Creativity) [FREE, 10]; IBAK (Identification, assessment and recognition of informally acquired competences) [IBAK, 08]; Open Badges [Mozilla, 11], etc.

All of these initiatives are mainly focused on the validation of informal learning and, particularly, on the development of issues relating to certification and qualification with a view to the recognition of competences. Less attention is paid to aspects relating to the support for, and facilitation of informal learning so that learners can integrate it in their portfolio. Though the recognition, conceived as certification of informal learning, is important, it is necessary to go beyond it in order to move towards its integration with other learning contexts and, in order to do so, TRAILER (Tagging, Recognition and Acknowledgment of Informal Learning ExpeRiences) project is defined.

TRAILER project, an ICT multilateral project funded by the European Commission, started on January 2012. For two years, a group of researchers from seven European institutions are working together to develop an innovative ICT-based service, which should allow the learner to identify episodes and evidences of informal learning and which should allow the institution to recognize those informal learning activities in dialogue with the learner.

Even if technology should let the project reach a technical solution, the key issue will relay on the consciousness of effectively acquiring skills and competences by the user. To become effective, the learning process must fall under the control of the learner. The learner must be able to identify his/her own informal learning experiences and to tag them in relation to a predefined but evolving catalogue of competences in his/her portfolio. Based on this premise, the ICT technology supports this learning paradigm by providing with the proper architecture, as so as a tool to link informal learning experiences to the institutional interface in such a way that relevant experiences will be accessible to both the institution and the learner.

This work presents a comprehensive overview of the TRAILER project describing its main objectives and outcomes (Section 2), followed by the methodological approach (Section 3). This methodology should be supported by a technological implementation (Section 4) and a study about how the learners and institutions deal with the informal learning (Section 5). Finally, some conclusions are posed.

2 Objectives, Outcomes and Partnership

The main objective of the project is to incorporate the consciousness of informal learning as part of an individual's development; this starts with the identification by the learner of informal learning activities and the subsequent process in which these are made visible to the institution. This task will be done by developing

methodologies and tools that will facilitate this process, making it transparent both to learners and institutions and allowing all the stakeholders involved to make the most out of these processes.

This objective implies a series of related sub-objectives:

- To create communication channels between informal learning activities and institutional environments, which the learner will use to make the informal learning visible to the organization (employer or university) in order to enter into dialogue about the competences developed through these informal processes.
- To define procedures and tools with which the user tags instances of informal learning and in doing so associates them with a predefined (but flexible) framework of competences.
- To create a space in which these tagged instances can be stored and then organized by the learner, in order to select instances or combinations of instances that the learner classifies as evidences of competence development and then chooses to make visible to the organization.
- To provide the user with information about other users with similar interest, promoting social learning and collaboration between the users of the system.
- To facilitate, with a range of decision making and visualization tools and an appropriate interface, the analysis by institution staff, such as tutors or HR managers, of the information the learner has made visible, in order to be able to make suggestions and provide feedback and support to the learner, define possible formal and non formal actions in the light of the informal activity and enter into dialogue with the learner in relation to this activity with a view to possible promotions or recognitions of competences acquired.
- To plan and to implement dissemination actions involving all relevant stakeholders in areas such as vocational training, universities, adult learning contexts and workplace training.
- To plan and to implement exploitation actions that promote uptake of the system developed in areas such as vocational training, universities, adult learning contexts and workplace training.

In order to achieve the main goals of the project a consortium of universities and companies was defined. It is composed by the following institutions:

- University of Salamanca - USAL (Spain).
- Universitat Politècnica de Catalunya (UPC) - BarcelonaTech (Spain).
- Open Universiteit Nederland - OUNL (Netherlands).
- University of Bolton - UB (United Kingdom).
- Dom Szkolen i Doradztwa Mykowska Aleksandra - DSD (Poland).
- Instituto Politécnico do Porto - IPP (Portugal).
- University of Belgrade - GB (Serbia).

All the members of the consortium have proven expertise in different areas covered by the project and the capacity and skills necessary to achieve the project objectives. In addition to this, such partners have participated together in several other projects. I

The University of Salamanca participates as the coordinator of the project; the Universitat Politècnica de Catalunya provides their expertise in methodological and

technological areas; the Open University of the Netherlands contributes with their experience in projects related with competences and knowledge management; the University of Bolton participates as a technological partner with experience in a competence project; the Instituto Politécnico do Porto as a technological partner with experience in remote labs; the University of Belgrade with their expertise in game-based learning; and the Dom Szkolen i Doradztwa Mykowska Aleksandra as a learning company with experience in content definition and distribution.

3 Methodological approach

The TRAILER project involves learners and institutions. 'Learners' may be workers in a workplace, or traditional learners in an educational institution. Through transparency of communication, the TRAILER environment enables discussion between the different stakeholders and institutions concerning informal learning activities, the associated competences and how this information can be exploited. In order to achieve this, a staged methodology supported by a technological framework has been deployed.

The TRAILER methodology defines a framework with several components and interfaces to make possible the interaction required. The framework is described in [Fig. 1] where it is possible to see a Personal Learning Network (PLN) that groups the tools that the user employ to learn in an informal way such as Wikipedia, Youtube, Games, Social Networks, LMS, Remote Labs, Expert Forums, Twitter, etc. This concept is derived from the concept of PLEs (Personal Learning Environments), which are learning environments that "provide students their own space to develop and share their ideas, through learning environments that connect resources and contexts so far apart" [Attwell, 07]. PLNs are a variation of these spaces that emphasize the idea of personal learning collaborating with others [Couros, 10]. The framework includes a portfolio in which informal, non-formal and formal learning experiences can be stored and published. There is also an interface to facilitate gathering informal learning activities. We call this component the informal learning collector (ILC). Additionally, there are several institutional tools. These are: a competence catalog that facilitates a way to identify the informal learning experiences taking into account learners or institutional perspectives; and an institutional environment that facilitates the analysis of the published information thus facilitating decision-making about learning issues related with the institution.

Given this framework it is possible to define a workflow that makes informal learning experiences transparent to learners and institutions in such a way that both of them will benefit. Such workflow consists on: 1) The learner, after identifying an instance of informal learning that has taken place in her PLN, tags it using an interface known as the Informal Learning Collector with tags from a predefined competence catalogue. This information is then stored in a portfolio owned by the learner. 2) At a later moment the learner can review the range of tagged informal learning instances and can decide which of them she will make visible to the institution (her employer or her tutors). 3) The institution is able to view this information and analyze it. 4) The information permits a dialogue with the learner in order to agree on the competences that have been acquired through informal processes, and orient future activity. The information also allows the institution to

plan formal and non-formal actions in the light of the informal learning that is taking place, and permits matching learners to others with similar interests based on their informal learning activity, interests and development.

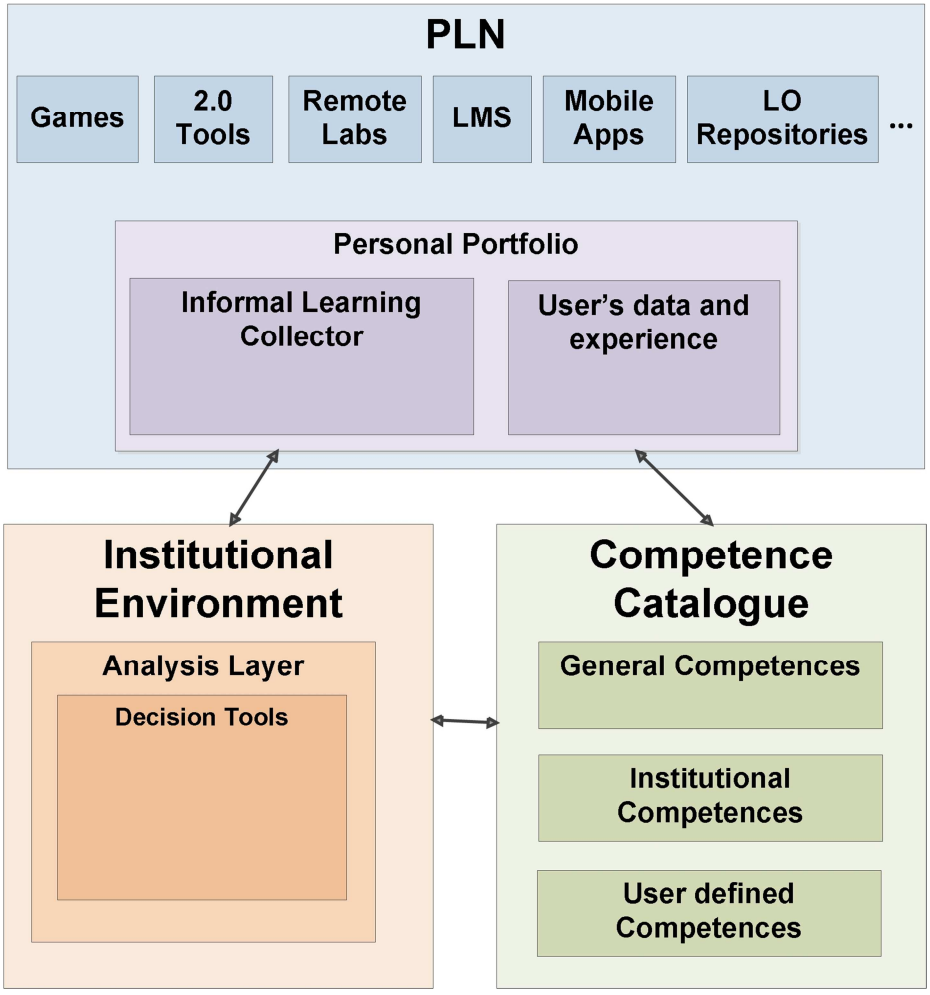

Figure 1: TRAILER framework that includes the PLN with the tools that the user uses to learn, the personal portfolio to gather the learning evidences, the catalogue that facilitates the informal learning activities classification and the institutional side that analyses the information

However in order to define a methodology from this framework two steps are necessary: the implementation of the framework to test the methodology; and a study about how informal learning activities are carried out by learners belonging to the target groups involved in the project. These two steps are described in the following sections.

4 Technological framework implementation

The technological framework prosed for the project should be implemented in a way that facilitates the integration of informal learning activities in the institution by using interfaces that make possible the dialogue among learners and institution responsible.

Taking into account that the informal learning activities can be carried out with very different tools (defined in different programming languages and with different data formats), it is necessary to design a service-based architecture to support this diversity. For this reason, the architecture is based on a set of components and a communication layer that facilitates the exchange of information and knowledge.

[Fig. 2] shows the distribution of the components and the communication interfaces. The most important components are the ILC that gathers information about the informal learning activities carried out in the PLN, the portfolio that facilitates the management of knowledge and information about the activities and the competence catalogue that provides a way in which to annotate the informal evidences.

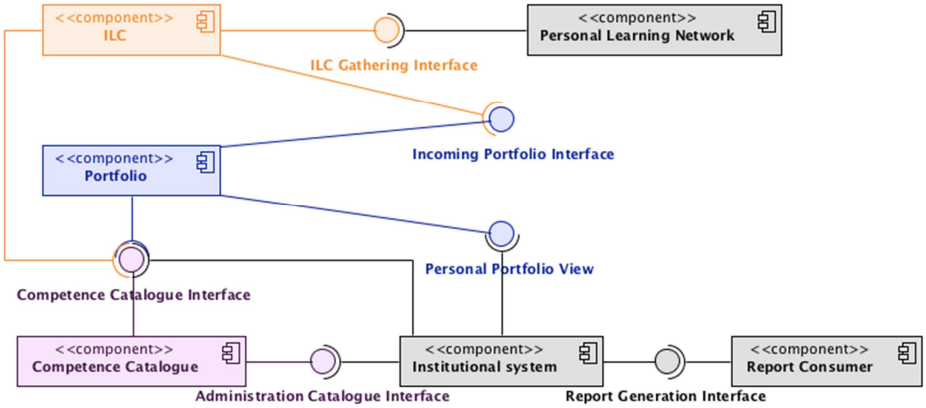

Figure 2: TRAILER components diagram, it includes de different communication interfaces and components, in different colour the ILC, Portfolio and Competence Catalogue

Given this framework it is possible to define a workflow that makes informal learning experiences transparent to learners and institutions in such a way that both of them will benefit. Such workflow consists on: 1) The learner, after identifying an instance of informal learning that has taken place in her PLN, tags it using an interface known as the Informal Learning Collector with tags from a predefined competence catalogue. This information will then be stored in a portfolio belonging to the learner. 2) The learner then at a later moment reviews the range of tagged informal learning instances and decides which of them she will make visible to institution (her employer or her tutors). 3) The institution is able to view this information and analyze it. 4) The information permits a dialogue with the learner in order to agree on the competences that have been acquired through informal processes, and orient future activity. The information also allows the institution to plan formal and non-formal actions in the light of the informal learning that is taking

place, and permits matching learners to others with similar interests based on their informal learning activity, interests and development.

Regarding to the communication interfaces in [Fig. 2] it is possible to see that the tools in the PLN use the ILC Gathering interface PLN to coordinate information about the informal activities. This component gathers the information through the provided interfaces and uses also the catalog interface to facilitate tagging of informal experiences. After that the information is stored in the Portfolio by using its interface. Once in the portfolio, the information is organized, completed and/or published. The portfolio also uses the catalog interface to gather the list of competences that the learner can use. If the information of a learner is published, the institutional environment could explore it by using the interface provided to do this. The environment also facilitates an interface to export reports related to a learner or the institution.

The various components and their interfaces are described below.

4.1 The Informal Learning Collector

The ILC acts as a mediator between the Informal Learning Activities (ILAs) and the portfolio The users send their activities to the ILC, where they get the chance to review them and define them using tags, competences, content (in the form of text) and comments before sending them to the portfolio.

Essentially, the ILC works as a buffer where the ILAs are stored with the minimum required information (Title, URL and date). Once there, the learners have the opportunity to enrich them with tags, competences and comments in order to send them to their portfolio in a more useful form.

The learners are provided with two different ways to send their ILAs to the ILC: a bookmarklet (a tool to send easily the URL of a page visited in the browser), and a set of web services. A third option of manually adding an activity to the ILC is provided in order to enable the storing of non-network-enabled ILAs.

Usually, the ILC's role begins upon receiving the data of an ILA. If the data is sent through the bookmarklet, the call is made to the ILC server entry page with the ILA web page title and URL being passed as URL parameters. If the ILC detects the presence of these parameters, it automatically inserts a new activity in its database and lets the user know that the activity has been successfully inserted in the activity queue.

If the activity is sent using the web services, the appropriate protocol is activated to receive the message. After authenticating the user and parsing the request, the protocol connector calls the function responsible for adding the ILA, passing the title and the URL (if any) as parameters. The function inserts the activity in the queue and notifies the user of the success of the operation.

Regarding the ILC user interface, when the learners connect to it, the server queries the internal database and recovers any outstanding ILAs they may have previously sent. Then the server informs the learners whether they have any ILAs in their activity queue and they are given the options to view these pending activities or add a new one manually.

Whether they chose to add a new activity or edit a saved one, they are redirected to a page containing a form where they can complete the information of an ILA and

associate it to competences or tags. Once the user save the activity it is sent to the portfolio.

The ILC is implemented as a web application developed in PHP. Its position in the center of the Trailer architecture means that it has to provide connection interfaces to the other two components of the platform (the Portfolio and the Institutional Environment) as well as an interface for receiving data from external ILAs and competences.

[Fig. 3] shows the internal architecture of the ILC. As shown, the ILC consists of four distinct modules. The ILC server which is the web application that provides the user interface and the functionality of the ILC, the external layer that contains the web service protocols and functions that can be used to receive ILAs from other tools, the module for the bookmarklet support and the user authentication module.

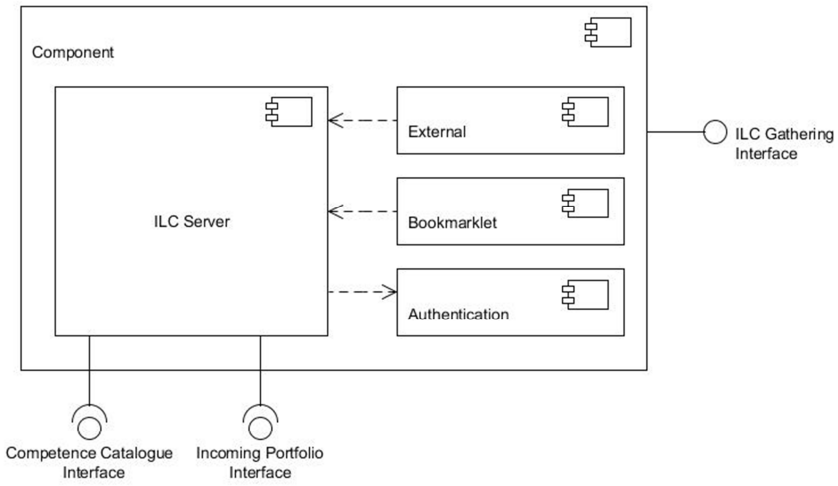

Figure 3: Component diagram of the ILC with the gathering components (External, Bookmarklet) and the server that includes most of the business logic

The system provides a service-based interface to gather the ILAs. This interface is defined to support as much web services protocols as possible. In the first version it supports JSON, JSONP, JSON-RPC, JSON-RPC [JSON-RPC, 11] with OAuth and REST [Richardson and Ruby, 07] with OAuth. Authentication is handled either using username and password, or using OAuth [IETF, 10].

Regarding to the other interfaces the competences are retrieved by using a JSON-RPC interface and the connection to the portfolio is done by using REST web services.

4.2 The Portfolio

The portfolio allows the learners to manage, organise and categorise their learning activities and competences acquired both in formal and non-formal learning contexts.

The learning activities and associated competences are added to the portfolio via external tools such as the ILC after which the owner can edit them. Once the ILA is in the portfolio the learner can associate one or more competences to it, effectively providing the learning activity as form of evidence for the competence. For those situations where no evidence can be provided, it is possible to add competences directly to the portfolio. The learner can decide at any time to provide evidence for these types of competences as well by associated learning activities to the competence in the portfolio. Both in the ILC and portfolio, learners can select pre-defined competences from an institutional competence catalogue (described in [section 4.3]). In case the institutional competence catalogue does not contain the desired competences, learners can add their own competences as well.

The portfolio includes furthermore a peer recommender that helps learners to see who else is working on the same competences, indicating a measure of similarity and giving them the possibility to contact the peer.

In addition, the portfolio provides learners with tools to demonstrate their development by combining their learning activities and competences, including additional annotations, into a showcase. Such a showcase can be shared for reviewing with others or can be exported to a PDF or a Leap2A [JISC-CETIS, 11] compliant file.

In order to define the architecture of the portfolio it is necessary to take into account these functionalities together with the leading design principles that the learner should have full control over the portfolio. The learner decides which applications are allowed to add learning activities to the portfolio, with whom showcases are shared and which learning activities may be accessed by the decision support system. This has a considerable impact on the architecture of the portfolio. [Figure 44] depicts a component view of the portfolio architecture.

The main component of the portfolio is the Liferay Portfolio Core (LPC) component. The LPC is composed of various sub-components that have been implemented on top of the Liferay Portal [LIFERAY, 13]. The portfolio functionality is made available through various JSR-286 [Hepper, 08] compliant portlets that are deployed on a Trailer Liferay portal instance. These portlets use the Java Server Faces 2.0 [Burns and Kitain, 09] as their Ajax enabled UI framework. The back-end services are implemented on top of Liferay's service builder technology [LIFERAY, 12]. Where possible, out of the box Liferay components have been reused, such as is the case for the tagging and the user components. Specific portlets have been developed for each of the portfolio features described earlier.

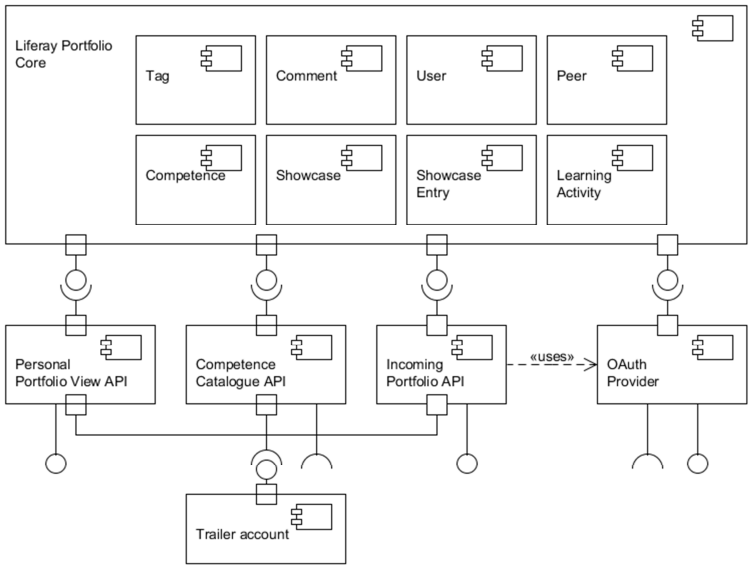

Figure 4: The portfolio component architecture with the core of the portfolio that facilitates ILA classification

Although the LPC provides all core functionality of the portfolio, it still depends on other components of the Trailer architecture to function properly; for example to add ILAs and competences to the portfolio. Therefore, a number of specific API components have been added to the portfolio. These API components hide specific Trailer API implementation details from the LPC, thereby ensuring separation of concerns [Dijkstra, 82] in the architecture.

Two different types of APIs can be distinguished. First, there are two APIs dealing with Trailer business-to-business service integration: the Personal Portfolio View API and the Competence Catalogue API. Both APIs rely on a trusted server-to-server communication, which is secured via firewall settings and data encryption. The Personal Portfolio View API provides data about the users ILAs to a decision support component. The Competence Catalogue API implements access to the competence catalogue that contains all competence definitions.

The second API is the Incoming Portfolio API that authorizes other components to add ILAs to the portfolio on behalf of the portfolio owner. To manage this authorization the API uses the OAuth 1.0 protocol [IETF, 10].

All APIs of [Fig. 4] use the Trailer accounts component (TA) which contains all additional user account information required for successfully connecting with the other components through the API's and to gather the competences related to each user institution.

4.3 The Competence Catalogue

The Competence Catalogue is a tool that facilitates the association by the user of competences and tags to their ILAs.

It is hierarchically stated in order to provide a structured but flexible environment to manage the skills and competences through the users' portfolios. The Competence Catalogue has been developed in three abstraction levels [Fig. 5]. The first level consists of a local catalogue that contains the competences added by the user and not (necessarily) validated by the institution. Whenever a competence from the local catalogue is validated by a responsible of the institution, such competence will become part of the institutional catalogue, which represents the second abstraction level. Finally, the third level is the general catalogue, which provides to all institutional catalogues a set of institutionally reviewed and accepted competences, it is initially filled with the competences and skills provided by the ISCO-88 [ILO, 87].

The Competence Catalogue developed two JSON-RPC interfaces [JSON-RPC, 11]. The Competence Catalogue Interface provides the available competences, tags and associated working areas to the ILC and the portfolio. The interface facilitates adding competences from the Catalogue to learner's portfolio and associating tags to ILAs added through the ILC. The Administration Catalogue Interface provides a way to manage the Competence Catalogue from the Institutional Environment in order to add or edit tags, competences and working areas. Only users with admin capabilities will be able to use this interface in order to ensure the data integrity. Both interfaces and the components that define this system are shown in [Fig. 6].

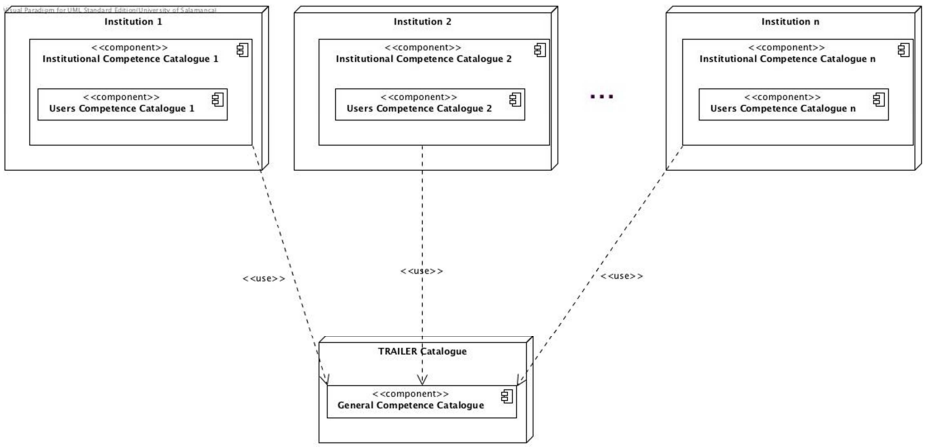

Figure 5: Deployment diagram of the competence catalogue, with a general part that is used by each of the institutional catalogues. These last include institutional and user-defined competences

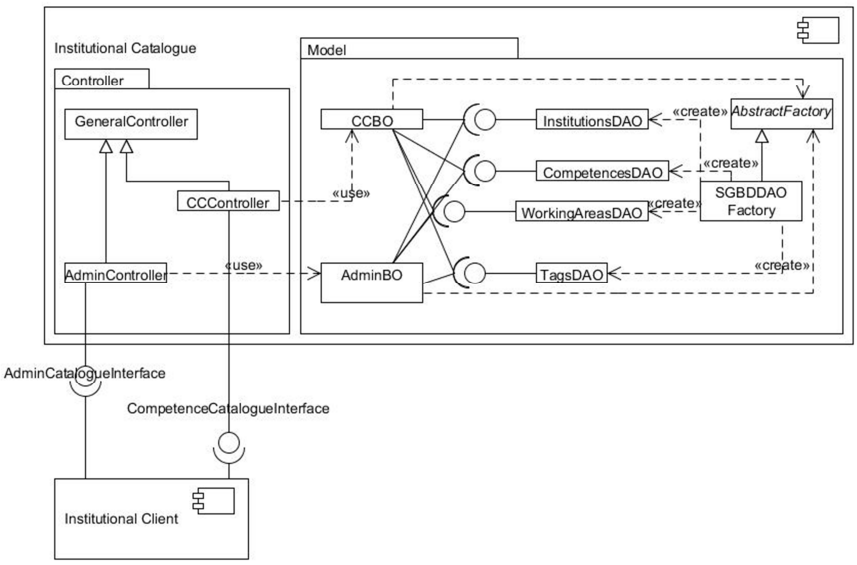

Figure 6: Competence Catalogue Component Diagram, it shows a client and an institutional catalogue, this one has a controller that switches accesses depending on the functionalities to use

5 Study about informal learning use

During the implementation of the Trailer project, the partners thought it would be useful to have first-hand information about the impressions of those involved in informal learning to be a guide on methodology and project characteristics. For this, some surveys and interviews have been carried out to provide usage information and expectations that students have on informal learning. It was thought as a small-scale survey, taking into account the project resources. In this way it could be done in less time and, although its statistical validity would be less, could guide the design and implementation.

5.1 Methodology

The study has been designed by combining different sources of information. On the one hand there have been four types of surveys focused on four different audiences: employees, businesses, students and colleges. A form was designed specifically for each of these groups and translated and distributed to members of the project. Google Docs forms were chosen as the way to collect data.

The surveys were intended to gather information on the use of informal learning as well as advantages and disadvantages.

On the other hand, there have been semi-structured interviews with managers of several companies selected in each of the partner countries. In these interviews it has

been possible to talk more deeply about how employees and companies understand the informal learning.

Finally, with all this data, a quantitative analysis of the forms and a qualitative analysis of the answers of the interviews were performed using a thematic representation based on matrixes [Miles and Huberman, 94]. All this information has been taken into account in designing the system methodology.

5.2 Sample and Materials

The surveys have focused on four audiences who wanted to represent different types of people involved in informal learning: Employee, companies, students and educational institutions. The distribution of the sample can be seen in the [Tab. 1]. On it is shown the number of employees/students and people in charge of the institutions involved from each area, and the number of different countries of the participants.

	Number of people involved	Number of different countries
Employees	147	12
Business	60	6
Students	217	8
Educational Institutions	69	5

Table 1: Sample description for the surveys

It should be noted that the experiment involves employees and students from a number of countries that does not match with the institutions countries. That is because the surveys have been disseminated in different ways. They have been sent to individuals (students or employees), companies and institutions from countries involved in the project, and also they have been published in blogs and social networks such as LinkedIn, Facebook, Twitter and Google+ in order to reach people from other European and non-European countries. Although the total number of 493 respondents is not a true representation, it still gives some impression on how the institutions and employees/students deal with informal learning.

Regarding the survey content, a specific version was defined for each collective. In this paper we present a select subset of the questions from the surveys. Three questions addressed to students and employees and three more addressed to companies and educational institutions. The selected questions were:

- For employees/workers:
    - How do you assess the results of informal learning?
    - Does your company/institution value your informal learning initiative and studies?
    - Do you have enough information and tools to help you locate materials and resources for learning?

- For business and educational institutions:

- Does your company/institution have the knowledge, resources, tools and support necessary to promote and assess informal learning of employees?
- Does your company/institution value the improvement in the informal learning of employees?
- What systems does your company/institution use to validate informal learning acquired by its employees?

Interviews were conducted with management staff and employees of institutions and dealt with:

- Use and motivations: What topics are their employees/students studying? What tools are they using? Which motivations are moving them to the informal learning?, etc.
- Tools and materials: Does the institution provide them with tools or materials? How do they search for and retrieve these tools, etc.
- Visibility: Does the company/institution encourage informal learning? Is the company/institution recognizing the achievements of the informal learners? Is there any protocol in the company/institution regarding the informal learning?, etc.

These questions and areas are taken into account to analyze in a qualitative way the results of the interviews.

5.3 Results

In this section we summarize the results of the surveys and interviews. As commented above three questions were considered for employees and students and three different ones for people in charge of companies and educational institutions.

The results for the employees/students were:

- How do you assess the results of informal learning? [Fig. 7].

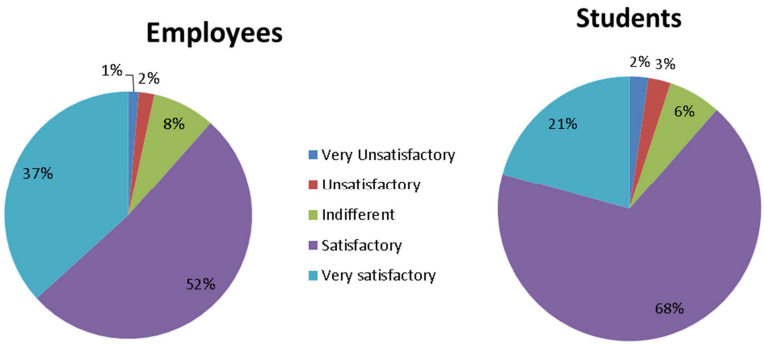

Figure 7: Results about how employees and students value their informal learning results

89% of the employees consider their informal learning Satisfactory or Very Satisfactory. The same is true for 89% of students, although the latter have a higher percentage of Very Satisfactory opinions.

- Does your company/institution value your informal learning initiative and studies? [Fig. 8].

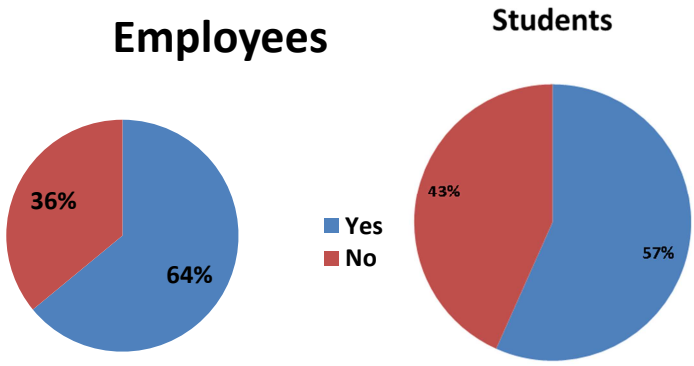

Figure 8: Results about if students and employees institutions value informal learning

64% of the employees considers their company value its informal learning and 57% of the students.

- Do you have enough information and tools to help you locate materials and resources for learning? [Fig. 9].

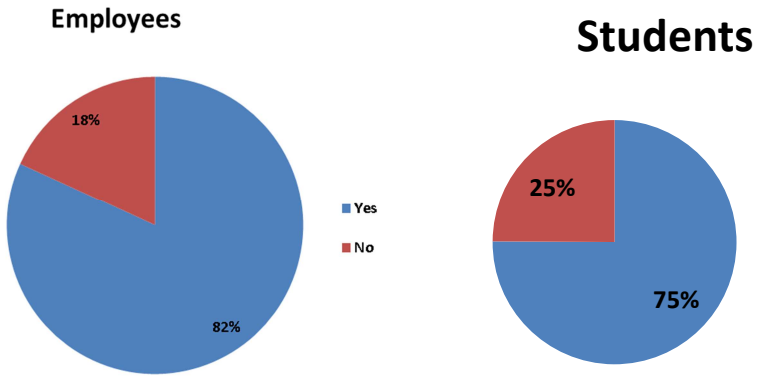

Figure 9: Results about if students and employees have enough information and tools to learn

82% of the employees and 75% of the Students think that have enough information and tools to locate materials and resources for learning.

With regard to the companies and educational institutions:

- Does your company/institution have the knowledge, resources, tools and support necessary to promote and assess informal learning of employees/students? [Fig. 10].

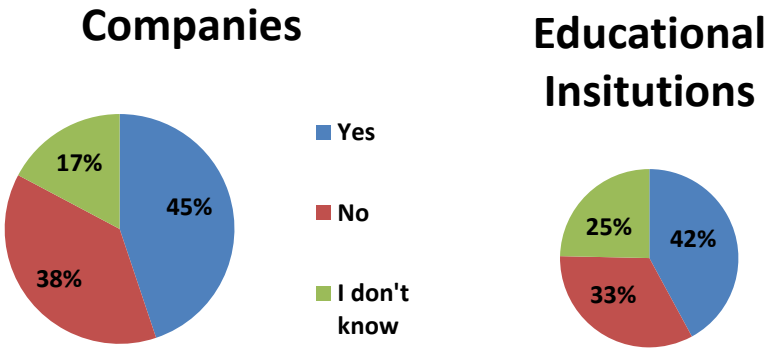

Figure 10: Results about if institutions have the knowledge, resources and tools to promote informal learning

In the educational institution just 45% of the participants has the knowledge, resources, tools and support necessary to promote and assess students' informal learning and 42% in educational institutions.

- Does your company/institution value the improvement in the informal learning of employees? [Fig. 11].

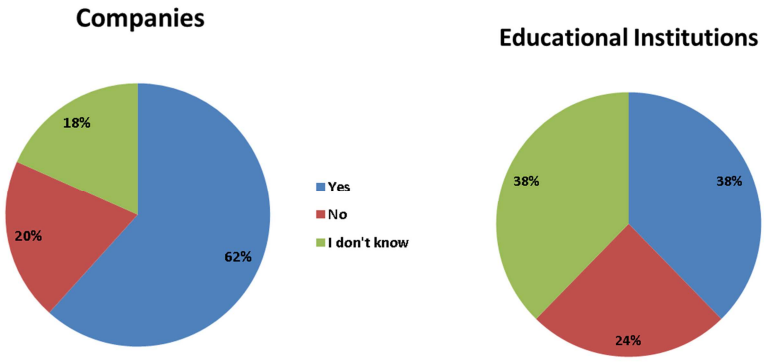

Figure 11: Results about if the institutions value the informal learning

In companies a 62% values the improvement in the informal learning of employees while in educational institutions this value is a 38%.

- What systems does your company/institution use to validate informal learning acquired by its employees? [Fig. 12].

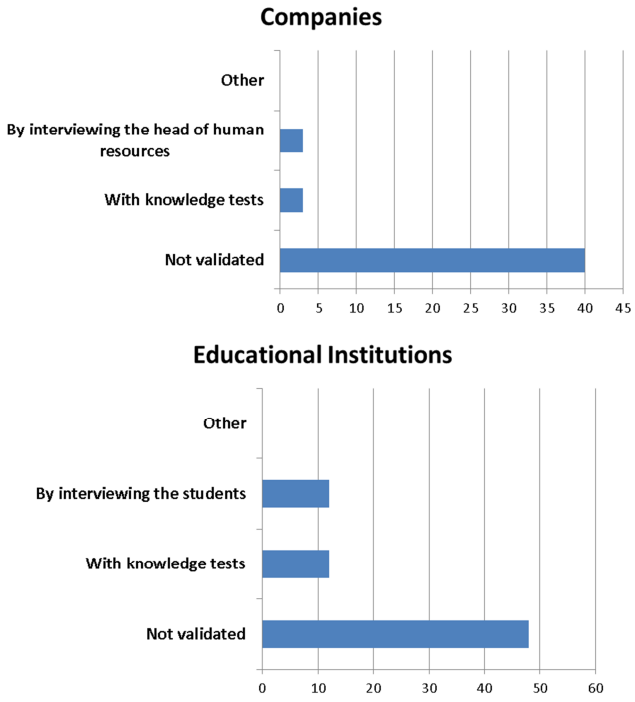

Figure 12: Description of the validation methods for the institutions

Most of the companies and educational insititutions do not validate the informal learning of their workers/students.

Regarding to the interviews, 4 companies and 3 educational institutions (one per partner) have been interviewed, the results are shown in the [Tab. 2] classified by the thematic previously mentioned. In the same way 3 students and 4 employees are also interviewed and the results are shown in [Tab. 3].

5.4 Discussion

In the previous section several quantitative and qualitative data analysis results are presented.

From the quantitative data gathered from the companies, educational institutions, employees and students some results are seen:

- Both employees and students consider their informal learning Satisfactory or Very Satisfactory with a high percentage (89%). This is because they learn what they want, with the tools they need and not necessarily linked to an institution or period of time. In fact a high percentage of them assert that they have enough information and tools to locate materials and resources for learning.

  In addition, for the employees and the students more than half of the institutions value the informal learning. This means than despite of the

benefits of informal learning they are not fully adopted nor considered by the institutions.

- With regard to the companies and educational institutions perspective, it should be noted that just the 45% and 42% of the companies and educational institutions have the knowledge, resources, tools and support necessary to promote and assess informal learning. This means that this kind of learning is not promoted and/or exploited in all the institutions because, among other reasons, they have no proper tools to do that.
  Moreover in a 62% of the companies the informal learning of employees is valued, but in educational institutions this percentage is the 38%. This can be caused because in the companies what is really needed is show that an employee has a skill not necessarily in a formal way (with a certificate) while in the educational contexts you should show it with formal evidences.
  Finally it should be taken into account that both companies and educational institutions do not have protocols, methodologies and tools to validate the informal learning of their employees and students.

	Use and motivation	**Tools and Materials**	**Visibility**
Company 1	Both informal and formal to carry out properly their jobs	Internet, experts forums	Foment informal learning, take it into account, no specific tools
Company 2	Improve job development	Internet, expert contact, peers	No way to see what happen
Company 3	To discover solve specific problems	Expert contact, talk with others	If the problem is properly solved
Company 4	Informal learning is not well known nor considered	-	No process, certified learning activities is preferred
Ed. Institution 1	Informal and formal	Internet, books, tools, simulators	No process
Ed. Institution 2	Formal	Web 2.0 and traditional tools	No process
Ed. Institution 3	Informal learning to improve employability of students	Books, Internet, Papers, Journals, Workshops, Seminars	-

Table 2: Qualitative results for the interviews of the companies and educational institutions grouped by areas

These conclusions are reinforced with the interviews. All companies surveyed use informal learning as part of their formation processes of employees. Encourage employees to carry out informal learning activities related to their work (maybe with the exception of some public institutions in which it is not so valued) and in many cases they provide tools and equipment to do so. Regarding with the tools employed, paper, libraries and the advice of more experienced colleagues are the main sources (although the main tool is the Internet).

	Profiles	Tools and Materials	Visibility
Employee 1	Fomented informal and formal learning by the company	Ask other colleagues, search in the Internet	No protocol to recognize informal learning
Employee 2	As a hobby	Internet, asking to others, internal training	Interviews but not a protocol
Employee 3	To do better my job	Internet, web sites, written materials, web sites, books, journals, seminars, workshops	I don't know, I have to show results
Employee 4	Applied to specific problems in my job	Social and collaborative tools in the Internet	Is not taken into account
Student 1	Informal Learning to solve my doubts and improve my employability	Internet, electronic books, simulators	No recognition
Student 2	Improve my skills and not only the institutional ones	Internet, LMS, 2.0 repositories	No process
Student 3	Improve employability	Books, Journals, 2.0 tools, institutional learning environment	No recognition nor validation

Table 3: Qualitative results for the interviews of the employees and students

Employees surveyed use informal learning in their professional and personal context. The main problem is the lack of protocols to validate and recognize informal learning and in this way to have the possibility to improve their position in the company or educational institution.

Taking this into account TRAILER should facilitate a methodology supported by a technological framework that makes possible the dialogue among employees/students and institutions about informal learning activities. That is, to make visible the employees'/students' informal learning evidences to the institutions in such a way that, the people in charge of them can make decisions or begin discussions based on such knowledge.

6 Conclusions

The evolution of ICT and its application to learning and teaching processes is something that changes the current educational landscape [García-Peñalvo and García-Carrasco, 02]. The application of the Internet and specially the Web2.0 and social tools makes evident that learners do not only learn linked to an institution but also in their daily life. Some of these activities are known as informal learning. Companies and educational institutions should take them into account to make decisions that can benefit both them and the employees and students. TRAILER was

defined in order to facilitate a methodology and a set of tools to make possible the tagging, recognition and acknowledge of learners informal learning activities.

In order to define this methodology it was necessary to analyze how informal learning was dealt in the companies and to implement a technological framework with which it would be possible to facilitate the informal learning dialogue among the learners and their institutions and also.

For the first task, a study was carried out and it was possible to conclude that, despite that the institutions and even more so the companies see the informal learning as something useful that should be taken into account, they do not have the necessary protocols and tools to support its validation and recognition.

Regarding the second task, a technological solution was defined. It includes a PLN to represent different kinds of tools that can be used to learn (LMS, social tools, games, widgets, remote labs, etc.), the ILC to gather informal evidences, the portfolio that facilitates the management and classification of them, the catalogue that allows tagging and associating the informal evidences to a set of competences and an institutional environment to facilitate the information exploitation. These components are connected through a flexible service-based framework.

Given the results of the study and the technological framework it is possible to define a methodology that considers: the identification and storage of the ILAs, the organization of such ILAs taking into account the existing competences (making them public or not to the institution or to others, and complementing them with extra information by using the portfolio) and the analysis of the published information in order to make decisions about the training needs of employees and students, the tools and contents used by the institutions and the specific skills each user has, both at the individual and group levels.

The methodology and the architecture components will be tested in the second year of the project. Initial expert and usability tests have been conducted and resulted in a set of tools that are now being evaluated among end-users of the Trailer target groups. These pilots are on-going. Feedback from the pilots will be used to fine-tune the components. Also during this year, the exploitation of the system has an important place in order to engage companies, educational institutions and decision makers in the project.

Acknowledgment

Support of the Lifelong Learning Program of the European Union. Project Reference: 519141-LLP-1-2011-1-ES-KA3-KA3MP. This project has been funded with support from the European Commission. This publication only reflects the views of the authors, and the Commission cannot be held responsible for any use that may be made of the information contained therein.

We would like also thank to the other members of the partnership also participates during the development of the project and do not appear as authors of the paper.

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