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Enhancing informal learning recognition through TRAILER project

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Abstract. The evolution of new technology and its increasing use, has for some years been making the existence of informal learning more and more transparent, especially among young and older adults in both Higher Education and workplace contexts. However, the nature of formal and non-formal, course-based, approaches to learning has made it hard to accommodate these informal processes satisfactorily. The project aims to facilitate first the identification by the learner (as the last responsible of the learning process), and then the recognition by the institution, in dialogue with the learner, of this learning. To do so a methodology and a technological framework to support it have been implemented. This project have been tested in several context and it is possible to say that an informal learning dialogue between learners and people in chargé of the institutions is possible

Keywords: informal learning, knowledge management, competences, recognition, dialogue

1 Introduction

Education is a key factor in the individuals' development. The set of competences and skills that persons achieve is determined by what they learn during their life. However learning is not only something that happens in the context of an institution (the school, high school, universities). People learn also along their life, from the interaction with peers in different context (at home, in their work, in social events, by using the Internet, etc.). This kind of learning which the users acquire away from an institution in the course of daily life, spontaneously and in non-structured way, is known as informal learning [1].

Informal learning is nowadays a trending topic specially because:

1) There is an effort to recognize informal learning. The Bologna process take it into account as key element in lifelong learning [2] and there are several initiatives to validate and recognize informal learning such as: the CEDEFOP guidelines for the recognition of informal and non-formal learning, the International Labour Organization classification of occupations [3, 4], the OECD Recognition of informal learning [5], etc.

2) It is necessary to make visible both for the employees and for the companies and institutions the learning obtained outside the institutional context [6]. This can benefit both employers and employees. It increase the employability workers that have the opportunity to learn and improve their knowledge and also to promote depending on the skills they have not achieved in institutional contexts [7, 8]. In addition it gives the companies more knowledge about their employees and a real perspective about what they can do and what they need.

3) 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 Information and Communication Technologies - ICT and, particularly, social media approaches, have facilitated these processes and, at the same time, have made them more visible [9].

Given this context it seems essential to make visible informal learning. However, despite the previously mentioned initiatives to recognize informal learning, and other focused particularly on issues related to the certification and qualification [10-12] [13]; [14] [15], a problem remains unresolved, how it is possible for employees and employers to exchange knowledge about informal learning activities (ILAs) carried out in different contexts. This is what TRAILER (Tagging, Recognition and Acknowledgment of Informal Learning ExpeRiences) project aims to solve. To do so it defines methodologies and tools that facilitate an informal learning based dialogue.

This paper presents TRAILER project. To do so the following section describes its main objectives and outcomes (Section 2), followed by the methodological approach and technological framework that support it (Section 3). This section also includes a

brief description about how the main components are implemented and how the methodology is tested. Finally some conclusions are posed.

2 Project Overview

The TRAILER project [9, 16] is a research project funded by the European Union through the Lifelong Learning Programme. The project is based on the premise that though technology may afford practical solutions to problems of personal learning, technological approaches can present new issues of ownership and control. The desire is that learning processes are under the control of the learner, and this entails that integration of informal learning with formal approaches balances personal inquiry and coordination with the need for institutional accreditation of evidence of competency.

The project aims to achieve this balance by bridging the learner's activity with institutional processes. The learner identifies episodes and evidences of informal learning in any of the different spaces in which she learns (formally or informally). She then links to these or uploads them to the TRAILER tool, located within her portfolio, and then tags them in relation to a predefined but evolving catalogue of competences. The tool is linked to the institutional interface in such a way that relevant experiences are accessible to the institution. Other experiences that may be personally relevant to the learner are accessible to her alone.

In this way informal learning experiences become transparent and useful both for the individual, who can thus monitor and justify to others the development of her competences, and for the institution, which can follow the progress of individual and group competences, and identify emerging new competences.

Five Universities (University of Salamanca, Universitat Politècnica de Catalunya, University of Bolton, Open University of the Netherlands and Polytechnic of Porto University of Belgrade) and one learning company (Dom Szkolen i Doradztwa) are developing the project. All of them have proven expertise in different areas covered by the project and some have work together in other research experiences with add value to the consortium.

Several of them have work together in other projects and all of them have experience with informal learning

3 Methodology and architecture

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.

3.1 The technological framework

The TRAILER methodology comprises a framework with several components and interfaces to make possible the interaction required [9]. 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 could be Wikipedia, Youtube, Games, Social Networks, LMS, Remote Labs, Expert Forums, Twitter, etc. One of the tools included in such component is the portfolio in which informal, non-formal and formal learning experiences can be stored and published. Such tool has an interface to facilitate gathering informal learning activities the informal learning collector (ILC).

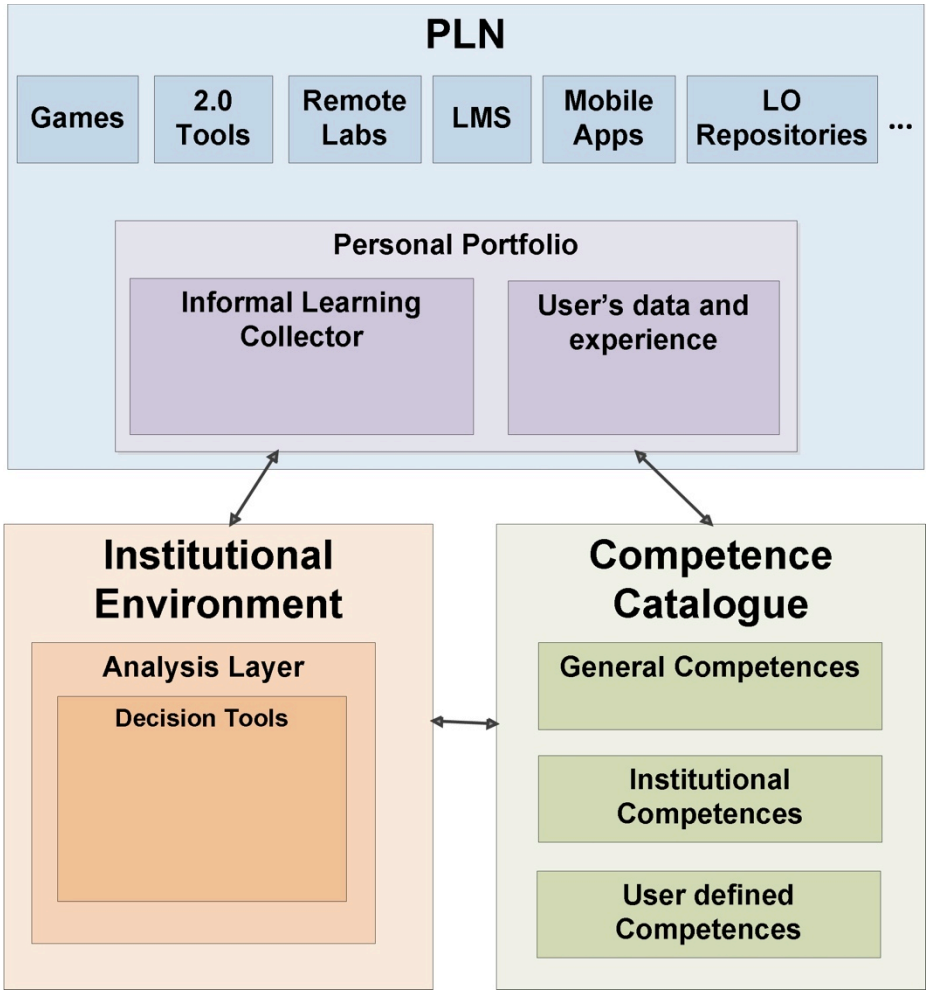

Fig 1. TRAILER framework components

On the other hand there are several institutional tools. These are: a Competence Catalog that facilitates a way to categorize informal learning experiences taking into account learner or institutional perspectives; an Institutional Environment that facilitates the analysis of the published information in order support dialog with the learner and to facilitate decision-making concerning learning issues within the institution (for example, accreditation processes).

3.2 TRAILER Methodology

The starting point of the TRAILER methodology is the moment in which the user carries out an activity online which may have a bearing on a competence. The learner can identify and match an activity with the set of possible competences presented by TRAILER, or store it and identify it later. The processes of collection, inspection and reflection result in a methodology with 3 stages:

1. Identification and Storage. It implies that the user classifies the activity taking into account a competence catalogue that includes general competences, institutional competences and competences defined by the user. After that the identified activity is recorded in the portfolio.
2. Organization. Once the information of the ILA is stored, it can include information about the associated competences or can require organizing it by employing the catalog. In addition, once it is stored, it can be classified into the portfolio in different categories or views. When the information is properly organized it can be published to the institution, with the learner determining what is published and to whom it is visible. With this information, institutions can conduct analyses on competencies, or the user could find peers with similar interests and/or worries.
3. Analysis. The public published information can be analyzed in order to make decisions about the learning requirements, tools and contents used by the institution and the skills a user has, taking into account a specific individual or a group. The publication of information and the views of the portfolio facilitate a common analysis of the gathered information, which can facilitate a dialogue among the stakeholders. The analysis system can produce recommendations regarding institutional skills or knowledge gaps or personal recommendations for the learner/employee. With this dialogue and recommendations, a global portfolio of knowledge can be co-created between the user and the institution. The components involved in this stage are the Portfolio, the Catalogue and the Institutional Environment.

3.3. Implementation of the framework components

The framework that supports TRAILER methodology is implemented as a proof of concept in order to test the methodology proposed. The implementation of this framework is not an easy task because it is not a solution defined from scratch. It involves different components developed in different programming languages that should interact and exchange information among them.

The main elements are:

- The ILC. It allows learners gathering ILAs. 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. It provides a *Javascript* gateway to send the activities gathered from the browser and a set of web services to consider other informal learning activity sources. In addition the ILC facilitates an interface that the learners can use to initially complete the ILAs information (Fig. 2).

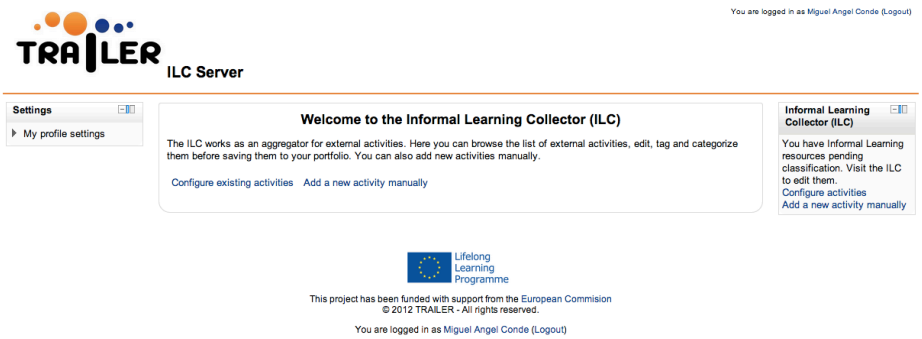

Fig 2. ILC competences configuration tool

- The portfolio. It allows the learners to manage, organise and categorise their learning activities and competences acquired both in formal and non-formal learning contexts. It provides functionalities to manage competences, informal learning activities, to control what is published to an institution and what is not, to create showcases share it with peers and to look for peers with similar aims. It has been implemented using *Java* and *Liferay*. Fig 3. shows one of the portfolio functionalities.

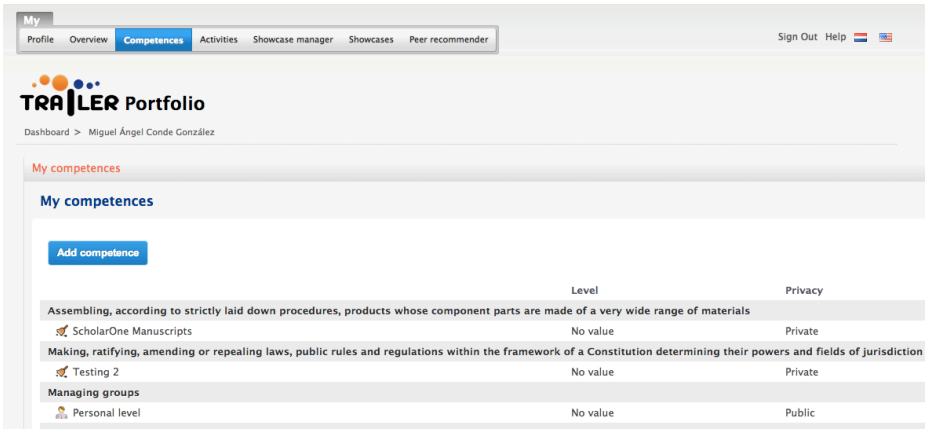

Fig 3. Competence management option in TRAILER portfolio.

- 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 three levels. 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 [3].
- The Institutional Environment. It is a component that provides a way to manage the competence catalogue, tools to facilitate making decision and tools to generate reports. Fig 4. shows an example of a visual representation of the competences used by the employees of an institution that can be further use to make decisions about what more competences the employees should have.

Fig 4. Example of tagcloud results

In addition to these components several interfaces have been defined based on the use of web services.

3.3. Testing TRAILER project

In order to check the validity of the methodology TRAILER project has tested through an expert testing and some pilots actions.

For the expert testing a Cognitive Walkthrough (CW) [17] has been used to explore the scenarios within the project and the potential experience of completing

project tasks in an early prototype of the system, complemented with Think Aloud technique [18]. With this testing was possible detect and solve errors before the pilots. Specifically 52 moments of breakdown were identified. Also a technique to measure usability was applied, the System Usability Scale (SUS) form [19] and a measure of the Perception of Ease Of Use (PEOU) by following a Venkatesh and Bala adaption of TAM3 [20]. From this experience it was possible to conclude that the usability of the system was not the desirable, something normal for a proof of concept. Bugs were solved and pilots have been carried out.

These pilots have involved companies and learning institutions from the partners' countries and were carried out taking into account the learners and the people in charge perspectives. The results of these pilots are being analyzed and will be presented in other papers.

4 Conclusions

Nowadays informal learning has gained special attention and has specially impact in the workplace and educational contexts. Employees need to show what they have learnt beyond the institution in order to promote in their jobs and/or find new ones. In addition the institutions needs to know the competences their employees have, in other to make decisions and to determine the tasks they can or cannot carry out. In the case of learners they can show to the institution what they know and the people in charge of them can adapt learning pathways depending on this knowledge background. This implies the articulation of a dialogue related to informal learning activities between employees/learners and people in charge of institutions. TRAILER project facilitates a methodology and a technological framework to do this.

The framework has been implemented has a proof of concept and test in several context. The results shows that the dialogue is possible but open other challenges such as if the informal learning is really being considered in the companies, if what is needed is a technological solution, if it is necessary to measure and recognize all person merits, etc. From a technological point of view the system can be improved introducing ways to deal with competences ambiguity, sematic layers enhance the decision support system and to propose competences to the learners, etc.

Finally it can be said that TRAILER project facilitates a dialogue to make visible informal learning but there is a need to see how informal learning can be really exploited.

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References

1. Coombs, P.H.: The World Crisis in Education: A View from the Eighties. New York: Oxford University Press (1985)
2. European-Union: Towards the European Higher Education Area. In: Area, E.H.E. (ed.), Conference of Ministers responsible for Higher Education in 29 European countries, Bologna, Italy http://www.bologna-bergen2005.no/Docs/00-Main_doc/990719BOLOGNA_DECLARATION.PDF (1999)
3. International Labour Organization - International Standard Classification of Occupations, ISCO-88 http://www.ilo.org/public/english/bureau/stat/isco/isco88/index.htm (Last Accessed 14/09/2013)
4. International Labour Organization - International Standard Classification of Occupations, ISCO-08 http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm (Last Accessed 14/09/2013)
5. Werquin, P.: Recognition of Non-Formal and Informal Learning: Country Practices. OECD - ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT http://www.oecd.org/dataoecd/22/12/44600408.pdf (2010)
6. Attwell, G.: The Personal Learning Environments - the future of eLearning? eLearning Papers 2, 1-8 (2007)
7. Dale, M., Bell, J.: Informal learning in the workplace. Dept. for Education and Employment (1999)
8. Halliday-Wynes, S., Beddie, F.: Informal Learning. At a Glance. National Centre for Vocational Education Research Ltd., Adelaide, Australia (2009)
9. García-Peñalvo, F.J., Conde, M.Á., Zangrando, V., García-Holgado, A., Seoane, A.M., Forment, M.A., Galanis, N., Janssen, J., Brouns, F., Vogten, H., Griffiths, D., Mykowska, A., Alves, G.R., Minović, M.: TRAILER project (Tagging, recognition, acknowledgment of informal learning experiences). A Methodology to make visible learners' informal learning activities to the institutions. Journal of Universal Computer Science (In press)
10. García-Peñalvo, F.J., González-González, J.C., Murray, M.: MyElvin: A Web-Based Informal Learning Platform for Languages Practice. International Journal of Knowledge Society Research 3, 26-39 (2012)
11. Berlanga, A.J., Sloep, P.B., Brouns, F., Bitter-Rijpkema, M.E., Koper, R.: Towards a TENCompetence ePortfolio. International Journal of Emerging Technologies in Learning 3, 24-28 (2008)
12. Schoonenboom, J., Sligte, H., Moghnieh, A., Hernández-Leo, D., Stefanov, K., Glahn, C., Specht, M., Lemmers, R.: Supporting life-long competence development using the TENComptence infrastructure: a first experiment. International Journal of Emerging Technologies in Learning 3, 53-59 (2008)
13. Fostering Return to Employment through Entrepreneurship, Innovation and Creativity http://web.spi.pt/free/ (Last Accessed 14/09/2013)
14. Identification, assessment and recognition of informally acquired competences http://www.competences.info/ibak/cms/website.php?id=/en/index/projekt.htm (Last Accessed 14/09/2013)
15. OpenBadges http://openbadges.org/ (Last Accessed 14/09/2013)
16. García-Peñalvo, F.J., Zangrando, V., García Holgado, A., Gónzalez Conde, M.Á., Seone Pardo, A.M., Alier Forment, M., Janssen, J., Griffiths, D., Mykowska, A., Ribeiro Alves, G., Minovic, M.: TRAILER project overview: Tagging, recognition and acknowledgment of informal learning experiences. In: García-Peñalvo, F.J., Vicent, L., Ribó, M., Climent, A., Sierra, J.L., Sarasa, A. (eds.) 2012 International Symposium on Computers in

Education (SIIE). Institute of Electrical and Electronics Engineers. IEEE Catalog Number CFP1286T-ART, Andorra la Vella (2012)
17. Polson, P.G., Lewis, C., Rieman, J., Wharton, C.: Cognitive walkthroughs: a method for theory-based evaluation of user interfaces. Int. J. Man-Mach. Stud. 36, 741-773 (1992)
18. Lewis, C.H.: Using the "Thinking Aloud" Method In Cognitive Interface Design. 1982)
19. Brooke, J.: SUS: A Quick and Dirty Usability Scale. In: Jordan, P.W., Thomas, B., Weerdmeester, B.A., McClelland, I.L. (eds.) Usability Evaluation in Industry. Taylor & Francis. (1996)
20. Venkatesh, V., Bala, H.: Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences 39, 273-315 (2008)