

A characterization and validation of Non-Formal and Informal Learning

Plan de investigación

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1. Introduction

The unprecedented wealth of information we have access to, has brought forth the emergence of what is called the modern Knowledge Society [1, 2]. Knowledge has always been one of the primary motivators of human progress. The continuous search for answers and understanding is responsible for the non-stop evolution of our species. However, never before have we had access to so much knowledge. Whether in terms of quality, quantity, general availability and ease of access, knowledge is more present than ever in our everyday life and there is little doubt that the main facilitator for the emergence of this knowledge society is the Internet.

Thanks to the Internet, we enjoy access to global connectivity and all the information that comes as a result. The versatile nature of the Internet has proven to be the ideal conductor for all kinds of information exchange. It provides a dynamic framework that allows for all kinds of communication, whether unidirectional or bidirectional, synchronous or asynchronous, symmetric or asymmetric. The benefits of having this wealth of knowledge at our fingertips are not easily quantifiable. Most of the times, access to knowledge is just a few keystrokes and mouse clicks away, whether provided by specialized digital knowledge platforms or by custom Internet searches. The simple act of aimlessly navigating the Internet can provide an important amount of information. All this information inevitably leads to knowledge, and given the amount of information we are exposed to constantly, this knowledge begins to gain important dimensions that can not and should not be neglected when examining the competences of individuals.

The growth of the Internet and the learning potential that comes with it, has led to a rising interest in the concept of lifelong learning. A number of organizations, foundations and projects like the University of the Third Age (U3A) [3] and the Lifelong Learning Programme of the European Community [4], are centered in promoting and facilitating continuous learning for all kinds of social, ethnic and economic groups.

When dealing with lifelong learning, three concepts that come up a lot are those of formal, informal and non-formal learning. Formal learning refers to the education received from a recognized education center that leads to a certification, with everything else being either non-formal or informal learning. An example of non-formal learning would be taking swimming lessons at the pool, while watching a tutorial video on how to change a car tire would be informal learning. Since 2004, the European Council has recognized the importance of non-formal and informal learning and has been taking steps to define a set of guidelines for their validation [5]. The goal of the European Council is to quantify which skills are available in the European workforce in an effort to promote better matching between the demand and the availability of skills within Europe.

A key aspect to almost all lifelong learning initiatives is the active role of Information and Communication Technologies (ICTs). Punie et al. [6] present a collection of evidence that modern education is heavily impacted by ICTs and come

to the conclusion [7] that non-formal, informal and adult learning are becoming important for the future of learning.

It is becoming increasingly obvious that the lines between formal, non-formal and informal education are becoming blurred in the sense that we end up participating in more than one of these types of learning at the same time. For this reason it is important to take into account the effort put into learning outside the formal structures and evaluate individuals accordingly.

The question in this case is: Can the knowledge obtained through non-formal and informal means be quantified and evaluated in order to be formalized and recognized within the competences of a curriculum?

A first attempt towards tackling this question was carried out by the TRAILER project [8, 9, 10], in which we had an active role designing one of the key components. The goal of the TRAILER project was to provide a methodology and a software platform that would facilitate communication of informal learning experiences between learners, employees and businesses. Our experiences during the lifetime of TRAILER led to our decision to continue working on the representation and evaluation of informal learning.

In this work, we aim to characterize and quantify the knowledge and abilities earned through digital non-formal and informal learning and propose ways to structure them in such a way that competencies gained through these means can be contemplated in a learner's curriculum. To this end, we ultimately aim to provide a framework able to gather activities from various digital sources, provide mechanisms for tagging and categorizing them and making them available in a form that can be appreciated, evaluated and used in a meaningful way for the benefit of the learners. To the best of our knowledge, there are no other works in the literature that achieve these results.

2. Hypothesis and main objectives

We are basing this thesis on two basic hypothesis:

1. Informal Learning is of real value to the learners. This value can be evaluated quantitatively and qualitatively.
2. Informal learning can be represented in a structured way, so as to be adequately represented alongside formal learning in a curriculum or a portfolio.

Starting from these hypothesis, we define the three main objectives of the thesis.

1. Evaluate informal learning by defining a set of methods, metrics and criteria.
2. Provide a more structured representation of an individual's informal learning through the use of tagging and ontologies.
3. Promote the social aspect of informal learning by providing a social and collaborative framework.

In more words, this thesis means to provide a categorization of the different informal learning resources available digitally and propose a framework for

incorporating and evaluating an individual's Informal Learning Activities (ILAs). For this categorization we plan to investigate into the definition of a reference framework of tags specific to informal learning that will provide the necessary indicators for this task. Once the categorization is defined, we aim to create a social framework that will allow users to associate ILAs to certain courses, share these activities with their peers, evaluate the activities of other users, undertake the same activities and start discussions based on the different ILAs.

In order to achieve this goal, we break it down to a series of research challenges that will need to be tackled:

1. Investigate into the resources (tools, techniques, processes, etc.) most commonly used for informal learning. Since we are focusing more on electronic informal learning, the tools we will be looking into are mostly IT tools and resources that enable, facilitate or promote informal learning in some way or another. For these resources we will need to identify the activities related to them and general information about their usage.
2. Analyze the informal learning potential of each one of the identified resources. By potential, we refer to each activity's contribution to informal learning. Obviously, not all activities have the same weight. Participating in a discussion in a specialized forum is not the same as going through a tutorial. That is not to say that it is more or less important. The importance depends on the context of each activity and the respective skills and competences involved.
3. Design mechanisms for obtaining all these activities and resources and introducing them into a platform. We want to gather all the learner's activities in a repository where they can be analyzed, processed and evaluated. Since getting these activities into the system will most probably be the first interaction of a user, it is very important to define an extensive set of intuitive mechanisms to do it. Flexibility and adaptability are also very important in order to provide compatibility with as many sources as possible.
4. Define an ontology of tags that the learners can use to accurately describe their activities. Correct and efficient tagging of the different activities within the system, will help in the indexing of the activities and will enable us to define heuristic algorithms to automate many of the operations within the framework. Examples of such operations are automatic curriculum generation, activity grouping, skill evaluation, etc.
5. Design an informal learning knowledge base. The platform will be gathering informal learning activities, so inevitably, what we are creating is, among other things, a knowledge base. This base, in order to be truly useful, needs to have a defined data set, a semantic information schema (the tag ontology should play a vital role here) and a set of rules for data and user interactions.
6. Identify and analyze potential uses of this knowledge base and the stakeholders that can be involved. These can range from the users themselves (CV generation, personal portfolio), to schools and the academia (LMS, online campuses), companies (workforce skill identification, contracting) or anyone actively involved into adult education and lifelong learning.

7. Define competences and skills the learners can associate their informal learning activities to. Define a set of criteria and metrics that will be used to associate specific tags or sets of tags to these competences. These criteria can be used for validating and evaluating a learner's informal learning.

3. Methodology

The general methodology we will employ for the duration of the thesis is the one of Action Research [11]. Action Research is research done while actively working on solving an immediate problem. It is based on a reiterating loop of "planning", "acting", "observing" and "reflecting" stages. Continuous iterations of this loop eventually lead to the desired outcome.

Our choice of Action Research as the main methodology is backed by the existence of some software engineering products we have already developed as part of the TRAILER project. These tools and the experience gained during their development will be used as a starting point for our work and will be considered as the first iteration of the Action Research methodology.

Going into some finer grain details for some of the more specific parts of our work, for our research into defining an appropriate tag ontology we are looking into techniques of social and collaborative tagging [12][13] and the creation of hierarchical taxonomies [14]. As far as the knowledge base is concerned, we are planning to do research into the ontologies and the rule sets that will better model how the informal learning activities contribute to individual skills and competencies.

Concerning the validation part of our research, there are a variety of methods and guidelines available in the literature [5, 15, 16, 17]. However, most of the available proposals tend to offer very generalized guidelines aiming to cover the entirety of the knowledge spectrum. Our experience with the TRAILER project has shown us that many of the guidelines and the methodologies proposed are not ideal for the premise of this thesis subject that centers mainly on digital informal learning. In our case we would need to employ a more concise and focused subset of these guidelines.

Finally, due to the social nature of the topic, we will rely mainly on Qualitative Research [18, 19, 20, 21] methods for the validation of our results. The data for the qualitative analysis will come from the users of the software engineering products that will be developed as tools for our investigation. We are planning to take advantage of our close contacts in USAL, the University of León, UPC-BarcelonaTech, as well as a number of private companies and involve them in the acting and observing stages of our research. By carrying out tests with students, teachers and employees, we believe that we will have a thorough set of data for analysis.

4. Resources

Material resources needed for the research we propose are limited to a computer and an Internet connection. Our research group is able to provide all the required material as well as a work place.

The research group also owns server hardware that we can configure to act as a host for providing user access to any software developed as a by-product of this thesis. Such access will be used for testing, evaluating and validating the results of our research.

Concerning the focus tests with the various user groups, our close collaboration with the target institutions and companies facilitates the organization of such actions and enables us to carry them out without the need for displacement in every single case. Should the need of displacement arise, the research group is able to cover the occurring costs.

5. Work plan

All the objectives mentioned previously were presented in an order justified by the process of designing such a platform. This does not mean however, that they need to be tackled serially. Research into some of them can overlap, while the dissemination activities will need to start as soon as possible in order to get some early feedback on the work.

First and foremost, in order to be able to design a working platform for informal learning characterization and validation we need to actually provide the basis for this characterization. We have already realized some work on identifying different IL resources. Once we have a final list, we will need to study the IL potential of the various resources in different scenarios and define an adequate categorization. This categorization will help on two fronts. First, the definition of the appropriate mechanisms for introducing the activities in the new ILC platform, and secondly, the appropriate format for keeping each resource in there.

Following this, we need to work on defining appropriate sets of competences and tags for the ILAs. Our experience with the TRAILER prototype showed us that unless the learners are able to efficiently characterize their informal learning, they will not invest the time asked of them. Providing an overly long list of specific and convoluted competences has proven to be far from ideal. However, providing a too generic one, or even leaving complete freedom to the users to define their own competences could lead to other equally important problems, with different titles being used for the same competences, or learners having to choose a competence even if it doesn't apply to their case, due to lack of options.

After we have defined the characterization framework and the learners can introduce their ILAs to the system, we will need to work on the issue of validation. Validation of informal learning has to be done on multiple levels. We need to define a model that will be able to evaluate the validity of the ILAs themselves, as well as their relevance to a particular job requirement. The validity of the ILA consists in

making sure that the activity has been introduced appropriately in the collector and has associated tags and competences that are in line with the defined conceptual model that will be the result of the work described in the previous paragraph. The second part of validation would be evaluating whether a particular activity, or a set of them satisfy requirements of a job posting, or if they can be used to promote a learner's competences. After all, this would be the main reason for having an informal learning registry.

Another major point of focus for the design of the new ILC is its social aspect. To us, social interaction is a major incentive for informal learning. The ability to be able to compare one's informal learning to those of their friends and peers can act not only as a huge motivator in the spirit of healthy competence, but also as an endless source of discovering new sources of informal learning and new competence that may be of interest to the learner. For this reason we would like to provide a social backbone to the framework so that the learners can compare their activity and competence to other users, maybe provide some capability for peer evaluation and commenting on other peoples' profiles. Social and collaborative tagging techniques are sure to play an important part in deciding how to better implement these social features.

Finally, we want to create a knowledge base that will contain all the informal learning of a learner. The definition of this knowledge base needs to be carried out with the highly heterogeneous nature of informal learning in mind.

In short, we propose the following time-line for completing tasks related to our research (Figure 1):

- October 2014: Identify, define and analyze ILAs
- February 2015: Define the ontologies for tags and competences. A first round of focus testing. Prepare a publication.
- August 2015: Definition of validation mechanisms
- October 2015: Definition of the social mechanisms. A second round of focus testing. Prepare a publication.
- April 2016: Definition of the Knowledge Base
- May 2016: Working version of the software platform.
- July 2016: Thesis document elaboration.

Concerning the dissemination of the results of our research, we plan to have three main publications: one after the conclusion of each round of focus testing, and a third to accompany the final stages of the thesis document elaboration. This does not include other possible publications that may be results of possible breakthroughs or collaborations with partners.

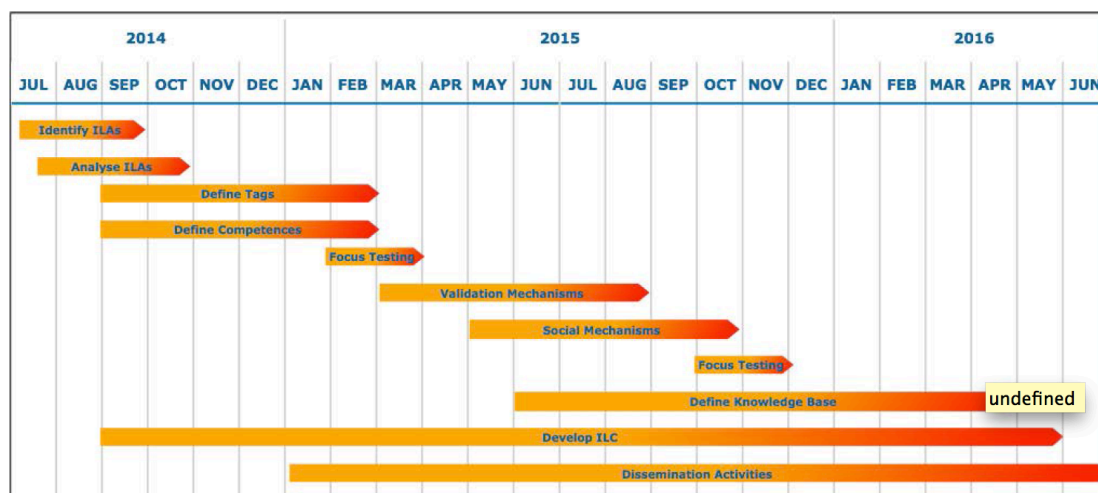


Figure 1. Work plan gantt chart

6. References

- [1] Stehr, Nico. Knowledge societies. Blackwell Publishing Ltd, 1994.
- [2] Mansell, Robin, and Uta Wehn, eds. "Knowledge societies: Information technology for sustainable development". United Nations Publications, 1998.
- [3] "University of the Third Age." [Online; accessed 18-February-2013].
- [4] E. Commission, "The Lifelong Learning Programme", 2007 - 2013. [Online; accessed 18-February-2013].
- [5] E. C. for the Development of Vocational Training, European guidelines for validating non-formal and informal learning. Office for Official Publications of the European Communities, 2009.
- [6] Y. Punie, D. Zinnbauer, and M. Cabrera, "A Review of the Impact of ICT on Learning", JRC 47246 ed., 2008.
- [7] Y. Punie, M. Cabrera, M. Bogdanowicz, D. Zinnbauer, and E. Navajas, The Future of ICT and Learning in the Knowledge Society: Report on a Joint DG JRC-DG EAC Workshop Held in Seville. Luxembourg: Office for Official Publications of the European Communities, 2006.
- [8] García-Peñalvo, Francisco J., Miguel Á. Conde, Valentina Zangrando, Alicia García-Holgado, Antón M. Seoane, Marc Alier, Nikolas Galanis et al. "TRAILER project (Tagging, recognition, acknowledgment of informal learning experiences). A Methodology to make learners' informal learning activities visible to the institutions." Journal of Universal Computer Science 19, no. 11 (2013): 1661-1683.
- [9] García Peñalvo, Francisco José, Valentina Zangrando, Alicia García Holgado, M. A. C. Gonzalez, AM Seone Pardo, D. Griffiths, M. A. Forment et al. "TRAILER project overview: Tagging, recognition and acknowledgment of informal learning experiences." In Computers in Education (SIIE), 2012 International Symposium on, pp. 1-6. IEEE, 2012.
- [10] Viegas, Maria C., Maria A. Marques, Gustavo R. Alves, Valentina Zangandro, Nikolas Galanis, Francis Brouns, José Janssen et al. "Using TRAILER tool for Managing Informal Learning in academic and professional contexts: the learners' perspective." (2013).
- [11] Reason, Peter, and Hilary Bradbury, eds. Handbook of action research: concise paperback edition. Sage, 2006.

- [12] Golder, Scott A., and Bernardo A. Huberman. "Usage patterns of collaborative tagging systems." *Journal of information science* 32.2 (2006): 198-208.
- [13] Macgregor, George, and Emma McCulloch. "Collaborative tagging as a knowledge organisation and resource discovery tool." *Library review* 55.5 (2006): 291-300.
- [14] Heymann, Paul, and Hector Garcia-Molina. "Collaborative creation of communal hierarchical taxonomies in social tagging systems." (2006).
- [15] J. Bjornavald, "Making learning visible: identification, assessment and recognition of non-formal learning," *Vocational Training: European Journal*, no. 22, pp. 24-32, 2001.
- [16] D. Colardyn and J. Bjornavold, "Validation of formal, non-formal and informal learning: policy and practices in eu member states1," *Euro- pean journal of education*, vol. 39, no. 1, pp. 69-89, 2004.
- [17] E. Communities, "Measuring lifelong learning," 14th CEIES seminar, Parma, Italy, 25 and 26 June 2001, 2002.
- [18] Myers, Michael D. "Qualitative research in information systems." *Management Information Systems Quarterly* 21 (1997): 241-242.
- [19] Kaplan, Bonnie, and Joseph A. Maxwell. "Qualitative research methods for evaluating computer information systems." In *Evaluating the Organizational Impact of Healthcare Information Systems*, pp. 30-55. Springer New York, 2005.
- [20] Maxwell, Joseph A. *Qualitative research design: An interactive approach*. Vol. 41. Sage publications, 2012.
- [21] Denzin, Norman K., and Yvonna S. Lincoln, eds. *The SAGE handbook of qualitative research*. Sage publications, 2011.