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Citation for published version (APA):

Marques, M. A., Viegas, M. C., Alves, G. R., Zangrando, V., Galanis, N., Brouns, F., Waszkiewicz, E., & García-Peñalvo, F. J. (2013). Managing Informal Learning in Higher Education Contexts: the learners' perspective. Paper presented at International Conference on Interactive Computer-Aided Blended Learning, Florianópolis, Brazil.

Document status and date:

Published: 08/11/2013

Document Version:

Peer reviewed version

Document license:

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Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
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Managing Informal Learning in Higher Education Contexts: the learners' perspective

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Abstract— Informal Learning is present in everyone's life but its awareness only recently has been reported. The need to keep track of the knowledge acquired this way is increasing as its sources diversity also increases. This work presents the pilots trials on the use of a tool developed to help keeping track of the learners' informal learning, within a number of European higher education schools. This tool developed through the European Commission founded project TRAILER, is still under development, which will allow integrating the set of improving suggestions obtained from users during the piloting phase. The overall idea of managing one's informal learning was well accepted and welcomed, which validated the emerging need for a tool with this purpose. In higher education schools, this tool also allows students to have a better insight on their academic curricula and the key competences they need to develop further.

Index Terms— competences, curricula management, higher education, informal learning, motivation.

I. INTRODUCTION

The distinction between formal, informal and non-formal learning started being fostered in the middle of last century [1][2]. According to recent studies, informal learning (IL) can account over 75% of our continuous learning through life [3][4]. Even though most of the methods of developing IL where always used, their awareness as far as contributors to learning and enhancer of competence development is more recent [2]. Reference [4] argues that since IL initiative starts from the learners, they become more responsible and so one of the reasons IL is effective is because it is personal. In fact this is in accordance with what is known as intrinsic motivation to learn [5]. In order to really develop deep competences on a subject, learners must be intrinsically motivated to do so (otherwise they simply cover the subject in order to fulfill the necessary imposed requisites). In this sense, it become important to watch and harness the more informal methodologies that students are using to develop their competences and expertizes [2]. This comprehension, which helps understand students' motivations and interests, can facilitate teachers to adequate their formal learning more accordingly to their contexts of use and even help students to potentiate their IL.

Also Reference [6] noticed that one of the ways that eLearning can help students to learn more effectively is

creating informal learning environments. However most schools still focus only on formal learning programs, loosing valuable know-how students develop [1]. Nevertheless many practices have been reported in literature as being equally or more productive, such as open peer discussion sessions [7]. These examples can be seen as a successful marriage between formal classes and IL processes, providing excellent results.

TRAILER project [8] is an ICT multilateral (two years) project funded by the European Commission that started on January 2012, with the aim of developing an innovative ICT-based service working in two (complementary) fronts: learners and teachers [9]. It allows learners to identify evidences of IL and link them with competences under development. Learners will then choose which ones they want to make visible to their teacher. Afterwards the teacher will work upon this information in order to support knowledge and curricula management.

This work analyses and compares a number of academic communities in four countries by using a group of learners from one or two higher education schools from each country involved in the pilots testing of the TRAILER tool. Section II of this paper starts with a summary of what the learners can expect from their interaction with the tool, followed by a description of the methodology used in the pilots testing and its population characterization. The obtained results and their discussion are presented in Section III, organized in three topics: usage, the TRAILER idea and IL profile. Finally, some conclusions are summarized in Section IV.

II. METHODOLOGY AND CASES DESCRIPTION

A. *The TRAILER tool: learners' perspective*

As already stated, this tool is structured in two perspectives. Although a brief statement of the aim of the institutional perspective is needed to framework the learners' perspective, this work is only focused on the latter and its results obtained from the group of academic institutions collaborating in the pilot trials. The TRAILER tool [10] is an integrated environment where the institution defines a set of competences considered important for their mission or purpose. These competences can then be seen (and used) by the learners within their accounts. In the context of the present work, considering a hierarchical context directly related to

students, the “institution” structure was narrowed to one course in a degree, where the teachers play the role of the top responsible of the students’ group, therefore being responsible to define the set of competences of interest for their framework. From here onwards, the term - institution - implies the stated context. As said, the aim for the learner is to collect evidences of Informal Learning Activities (ILA’s) related to the IL he is gathering and, at the same time, associating it with competences being developed. These competences can either be those defined by the institution, or general competences, or even new competences defined by the learner, in the case he does not find any appropriated in the provided competence catalogue. This process can be undertaken in two stages: first, collecting ILA’s and in the second stage, further describing and associating competences to those ILA’s. The tool also provides a “peer recommender” option, showing people with similar competences to the ones defined by the learner. This feature is most useful to find people with whom the learner can somehow collaborate. Additionally, by using this tool, learners can benefit from organizing and registering their IL in the way seen as most convenient.

B. Methodology

One of the objectives of the TRAILER tool testing was validating the TRAILER idea, as well as, assessing the learners’ perspective and acceptance on using this type of tool to organize their IL. The TRAILER tool testing consisted on allowing the pilots institutions to explore it in the learner’s perspective during approximately one week, with a set of tasks to be accomplished during that period. This period started with a hands-on introductory workshop, where it was explained how to use the tool, which was attended by the expected learners (students who had previously agreed to participate in the trial). These workshops were conducted separately in each institution. The testing period ended with a focus group meeting to discuss their perceptions and experience and to gather their suggestions. This meeting was planned to gather not only information about the perceptions on IL but also information related to usability, usefulness and friendliness of the tool. These issues were also addressed in pre and post questionnaires answered by the learners in the beginning of the workshop and before the focus group discussion, respectively. During the whole testing period, each learner’s activity was registered in the platform, gathering information to characterize the users profile for each institution, frequency of use, IL provided evidences and associated competences, and to assess the will to publish personal information.

C. Cases characterization

The group of higher education schools participating in the TRAILER tool pilots trials are related to two main areas of knowledge: Education and Engineering (see TABLE I.). There are three levels of students: freshman students, senior students and PhD students (aged 26-40 years old). In each case, the universe is considered the number of participants who intended to participate and the sample the number who actually used the tool.

The two participating engineering schools have more than 6000 students and offer several engineering area degrees and MSc’s. In these schools the pilot testing was implemented in a first year course of the Automotive

Engineering degree (PT_S) - at the School of Engineering – Polytechnic of Porto (ISEP) - and in a third year course of the Computer Science degree (S2_S) - at the Technical University of Catalonia (UPC). In the remaining set of universities, pilots trials were implemented with groups of students of Education related degrees. At the University of Salamanca – Faculty of Education (USAL), some of the senior students (3rd year) participating were from Pedagogy degree and others from Social Education degrees (S1_S). The other senior students group belongs to University of Science and Technology – Akademia Gorniczo-Hutnicza (AGH) in Poland, also studying education related degrees (PL_S). The group of PhD students, from the Open University of The Netherlands (OUNL), were conducting their PhD studies at the Centre for Learning Sciences & Technologies (NL_S).

TABLE I.
PILOTS TRIALS PARTICIPANTS CHARACTERIZATION

Learners: Students (S)		
PT_S	S2_S	
Context: Engineering 1st year students Ages: 18-25 years Universe: 30 S Sample: 14 S	Context: Engineering 3rd year students Ages: 18-25 years Universe: 20 S Sample: 20 S	
S1_S	PL_S	NL_S
Context: Education 3rd year students Ages: 18-25 years Universe: 74 S Sample: 15 S	Context: Education 3rd year students Ages: 18-40 years Universe: 13 S Sample: 11 S	Context: Education PhD students Ages: 26-40 years Universe: 21 S Sample: 14 S

III. RESULTS AND DISCUSSION

A. Learners usage characterization

In a prior phase of the pilots’ trials, students were contacted, either by their teachers or by the projects members, and invited to participate in the pilots’ phase of the TRAILER project. TABLE II. shows the participants who accept the invitation (previewed) and those who actually were present at the introductory workshop. In some cases (PT_S and S1_S) the percentage of dropouts was over 50%. One of the reasons pointed out by their colleagues was related to other students’ events at the same time as the workshop.

On the other hand, taking into account those participating in the workshop, in average, 88% were considered “active users” as 12% were considered dropouts (in this phase). Being an “active user” implies collecting ILA’s (in the 1st stage) and describing them and associating competences (in the 2nd stage). The highest percentage of non-users (36%) was observed in the case of PL_S (Figure 1.).

To classify the learners’ usage effort, the number of ILA’s collected in the 1st stage and worked with in the 2nd stage was registered per learner (i.e. user) and the average number of ILA’s per learner was calculated. These results (TABLE III.) show a poor usage (below average) in the freshmen students, an average usage for senior students (with the exception of S1_S) and a higher usage for PhD students, which is the group expected to be more aware and recognizing IL learning related issues. Also, considering the 2nd stage, this trend is maintained in spite

of the number of ILA's worked with in this stage being in average around 70% the total in the 1st stage. The freshman low usage can be explained by the fact of not being fully aware of the importance of registering ILA's and their associated competences.

TABLE II.
LEARNERS PARTICIPATION IN VARIOUS STAGES INTERACTION

Institution	TRAILER tool pilots testing				
	Users	Previewed	%	Active users	Non-users
PT_S	14	30	47%	14	0
S2_S	20	20	100%	18	2
S1_S	15	37	41%	12	3
PL_S	11	18	61%	7	4
NL_S	14	18	78%	14	0
Totals	74	123	60%	65 (88%)	9 (12%)

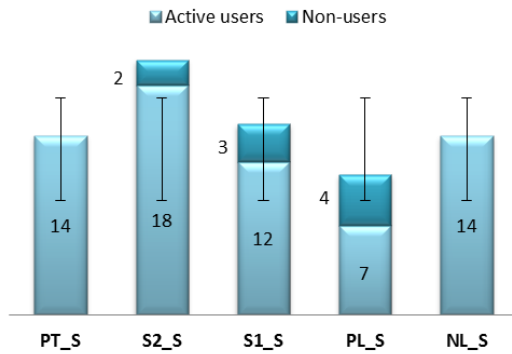


Figure 1. Learners' participation in the two stages of the tool. Active users are those completing the 2-stages cycle. Non-users are those only collecting ILA's but do not work on their description or associated competences, accomplishing only the 1st stage.

TABLE III.
ILA'S RELATED ACTIVITY WITHIN THE TWO-STAGES INTERACTION

Institution	1 st stage ILA's	2 nd stage ILA's	%	1 st stage ILA's per user	2 nd stage ILA's per user
PT_S	50	26	52%	3.6	1.9
S2_S	116	95	82%	5.8	4.6
S1_S	57	28	49%	3.8	1.8
PL_S	61	37	61%	5.5	3.4
NL_S	120	97	81%	8.6	6.8
Totals	404	283	70%	5.5	3.7

On the other hand, this also applies for the PhD students, in the opposite sense, since their awareness is reflected in their higher usage, although they scored the usability of this tool below average through the answers given to questions presented in Figure 2. This could be due to their stated difficulty in marking out IL boundaries, as resulting from their experience. This will be discussed further in section B. In order to have an idea of the amount of work learners put in characterizing their ILA's, namely by associating competences, Figure 3. shows the number of competences per ILA for each collaborating institution.

Comparing them to the overall average of 1.4, only two of them are above this value, corresponding to those having small relative variation (21% for S2_S and 32% NL_S) in the number of ILA's per user for the two stages (see TABLE III.), indicating a more uniform usage between them. An exception is the case of NL_S, which, although having a similar relative variation of 21%, these learners put more effort in collecting ILA's than associating competences to those evidences.

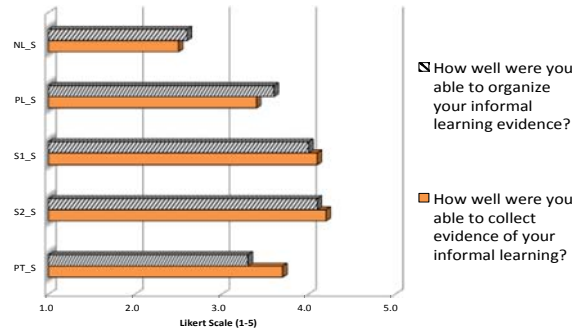


Figure 2. Post questions related to the usability of the tool.

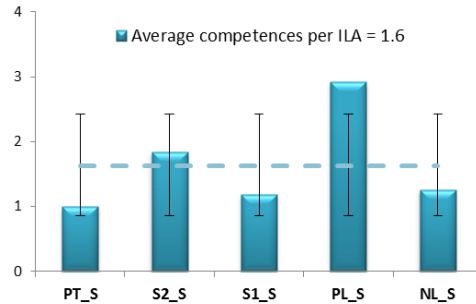


Figure 3. Average competences per ILA, shown for each institution. Reference value represents the average value for the whole population

Even though this way of measuring the amount of work put in the usage of the tool allows differentiation between learners, another meaningful input is gathering information about the average number of interactions per user per day and the absolute maximum number of interactions in a day, for each institution (Figure 4.). This can also be correlated with the average number of days of use and its absolute maximum number, for each institution.

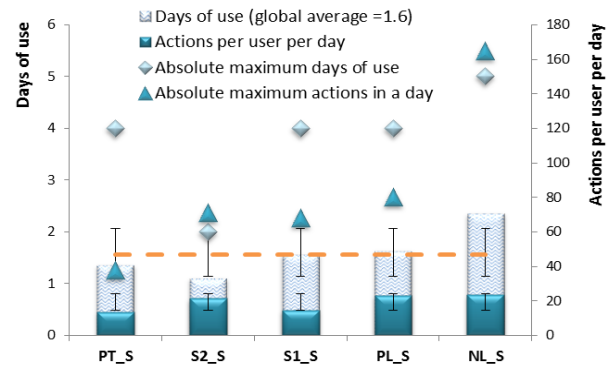


Figure 4. 2nd stage usage characterization representing per user: the average interactions per day and its absolute maximum number in a single day as well as the average number of days of use for each institution and its absolute maximum.

Comparing all these results, in general all the institutions had a similar performance in their 2nd stage interaction, with close to average number of interactions per user per day (19.6 ± 4.7). But tracing this average with the maximum number of interactions in one day, the highest dispersion of results appears in the PhD group, where one student had 165 interactions with the tool. In spite of it, this is the group that used the tool for more than two days which is above average (1.6 days). Somehow surprisingly, if considering the related knowledge area, engineering students were the ones using this tool approximately only one day (in average) (Figure 4.), which is comprehensible for freshman, since they do not feel the immediate benefit from using it, but not so much for senior students.

As said before, learners decide whether or not to make their competences and ILA's public to others. In evaluating this aspect, which somehow exposes their personal information, it could be found that the great majority (92%) of the collected activities are not made public (Figure 5.). Learners have used the tool as a personal record facility, rather than a platform where students could communicate with teachers by publishing their activities. At least at this stage, students want to keep their activities for themselves, which was a common feature in all the institutions involved.

When looking at competences, they are much more keen on sharing them (36% are published), maybe because they understand it could lead to a better adaptation of the goals and curriculum of the course (at the teachers side) to the present group of students skills and interests. This relation is more straightforward for students than for teachers. Even so, 43% of the user defined competences are published when compared to 35% of the ILA associated competences (Figure 6.), indicating that when learners are willing to introduce new information (not present in the tool) they have a higher predisposition to publish those competences.

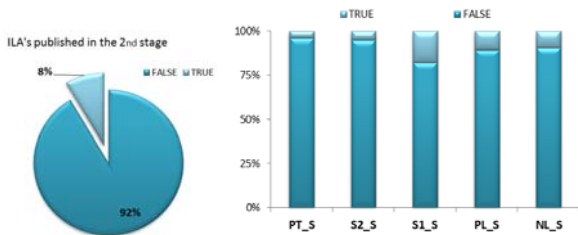


Figure 5. ILA's distribution in terms of published (TRUE) or not published (FALSE), also discriminated by institution.

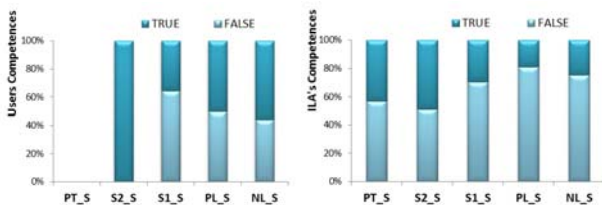


Figure 6. User defined competences identified as published and not published by institution (left graph) and ILA associated competences identified as published and not published by institution (right side graph).

At the same time and still related to competences, it can be shown that learners tend to choose competences from the competences catalogue (86%) rather than defined it

themselves (Figure 7.), which is understandable since user defined competences lack validation from their teacher. In the approach of this tool, validating a competence only means that the teacher accepts it as of interest for the course.

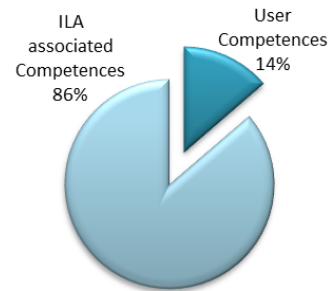


Figure 7. Competences distribution in terms of user defined or ILA associated competences.

B. The TRAILER idea

In general, students embraced the idea very well, even though some were a little more confused about what exactly could be considered IL. Especially the PhD students question the nature of IL and its boundaries that distinguished it from formal and non-formal learning. For them, at the end, almost everything could be considered IL.

Even though participants have caution stating their recognition about their IL, their answers in post questionnaire became more coherent, in most cases showing a lower standard deviation (Figure 8.). This could indicate that through the work performed during the piloting week, participants not only tend to acknowledge better their IL, but also in this case, it helped participants who had more reserves about considering it.

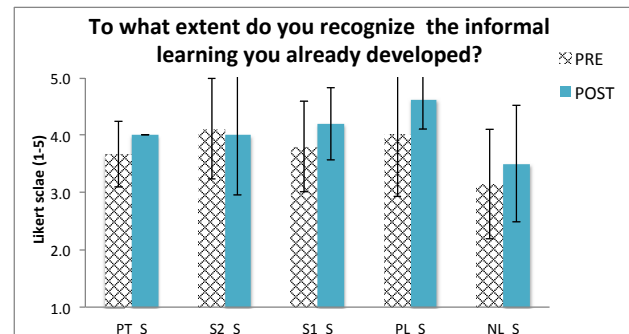


Figure 8. Pre and post question related to IL awareness

In spite of these results, some participants did confess that they did not recognize some of their regular activities as being possible forms of IL, that is, they did not thought they were learning while doing such activities. Some students had a strong opinion about IL, considering it not as much valuable as formal learning undertakings. Its perception as well as its importance and achievements became clearer after the workshop and after answering the pre questionnaire, where some of the ways one can develop IL were expressly indicated. Some learners stated that the fact IL becomes more visible, opens the possibility of showing it to others and contributes to the increase of its relevance.

When asked about their usual ways of developing IL (Figure 9.) and the relative importance of the different

methods used, there were no significant differences between the two contexts (education and engineering). A curious fact is found in “conversations”, which plays a slightly lower importance in engineering students than in education. Students tend to valorize slightly higher some of the most common ways they study, such as “trial and error”, “reading” or “searching in the internet”. The highest values were almost always found for the younger learners group (PT_S), with the exception of “searching the internet”. This could be a good indicator since they may know they could still not be experienced enough in selecting trustworthy materials. Typically, the lowest values of importance attributed to these ways of IL are found for PhD students, but this could be related to their initial statement of not being sure of what IL was.

Regarding other ways of developing IL, some participants identified radio, TV, podcasts and cultural events.

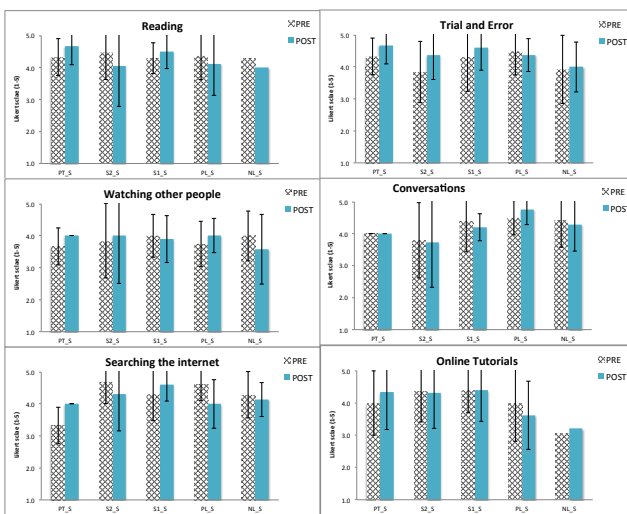


Figure 9. Pre and post question related to the importance of different ways of developing IL

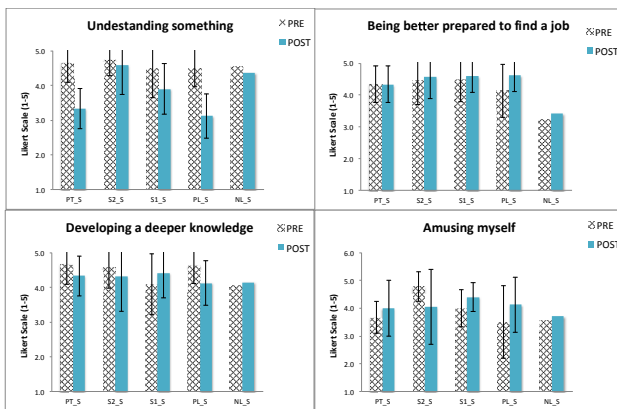


Figure 10. Pre and post question related to the goal of developing IL

Figure 10. shows the distribution of answers regarding the goal learners have when they develop IL. It is interesting to notice that in general questions related with developing IL in order to “understand something” or even to “develop deeper knowledge about something”, shows a higher score in the pre questionnaire than in post questionnaire, in almost every case. On the other hand, answers from post questionnaire have, in average, higher scores regarding a “deeper knowledge” when compared to simply “understand something”. Clearly learners’ opinion

changed during the use of the tool: they seemed to start giving more relevance to their IL achievements.

In the case of PhD students (NL_S), (the eldest group), their expectations of IL contributing positively for them to find a job became lower, which is natural when compared to younger students who still feel more confident about this issue. The goal of “amusement” score lower than the rest, with the exception of science computers (informatics) students (S2_S), probably reflecting their keenness for videogames.

The usefulness of the tool was also assessed through the post questionnaire and again during the focus group open discussion. Although, in general they liked the idea of having a tool to registered IL, which is in agreement with the results presented in Figure 11. (again, with the exception of PhD students), they identified some issues that could undermine the transparency of the tool, namely some students indicated the use of similar words for competences: “*may deliver false results, if the teacher searches for with a particular word and the student defined it differently*”. These reserves are also evident in Figure 11.

When asked directly if they would like to use a tool like this in the future, most students answered affirmatively, but not in its current state since it was too much time consuming and not very user friendly.

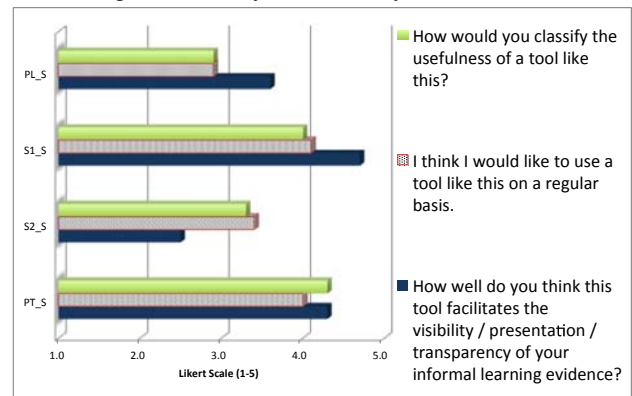


Figure 11. Post questions related to the usefulness of the tool.

C. The learners IL profile

One interesting feature of the TRAILER tool is gathering the tags associated to each ILA in a tag cloud. Looking at the tag clouds emerged from the five institutions (Figure 12.), taking into account their collection of activities during the trials’ week, in general they have similarities pointing to each context of expertise development: engineering or education. Computers appear in both contexts, but that is also comprehensible due to its global usage. Students have a consisting profile with their major courses: one of the groups was related to automotive engineering (1st year students) and the other 3rd year students were finishing their degree in computer sciences, or in education, which is also evident from the tag clouds (Figure 12.). The PhD group interests are also reflected in this cloud, giving relevance to other interests such as “papers” and “research”. This insight can be very useful for each learner if assembled only for each user, but is much more useful for the institution, allowing to have a quick glance at the interests which stand-up.

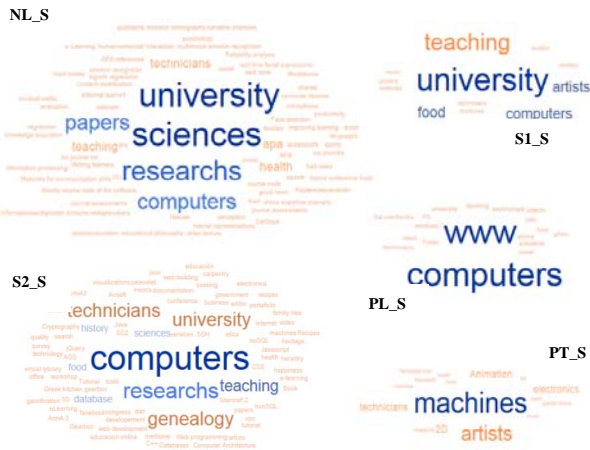


Figure 12. Tag clouds for the participating institutions.

During the focus group meetings with each group, some concerns were brought up regarding what teachers might do with the available information. It is a comprehensive concern, since the second pilot phase related to the institutional perspective, was to be implemented afterwards (with teachers) due to time constraints, instead of a simultaneously implementation of the two perspectives. This fact might have restrained a more open participation and the partial understanding of the TRAILER tool full capacity.

IV. CONCLUSIONS

One of the main conclusions of this work is that even though IL is known as very relevant in students' lives and their developments, it's still under recognized at its full potential.

The set of higher schools involved in the study allowed to observe a certain pattern related to the degree year the students were enrolled: freshman had a greater dropout percentage, and as some colleagues confirmed, they have some difficulty perceiving the objectives and the high-value of participating in this kind of extracurricular activities (since there is no grade and therefore no benefit). On the other side, PhD students, being more reflective in their assumptions, had more difficulty in accepting this tool as a potential benefit, since they already developed parallel ways of achieving similar results.

The studied cases do not allow to establish any pattern of usage related to students context (engineering or education) unless their profile (revealed in the tag clouds) which is consisting with their area of expertise. This aspect combined with a perceptive attitude from the teachers in empowering their students learning by adapting the focus of methodologies and tools to the students' interests, is a promising approach made possible with the TRAILER tool for innovative learning adaptive technologies.

ACKNOWLEDGMENT

This work was developed with the support of the Lifelong Learning Program of the European Union. Project Reference: 519141-LLP-1-2011-1- ES-KA3-KA3MP. The authors wish to thank all the participants in the trials, namely all the students from ISEP, USAL, UPC

OUNL and AGH, who largely contributed to the work presented here.

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