Steps to Reflect on the Personal Learning Environment. Improving the Learning Process?

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Abstract. The work that we describe here is a work in progress that we are carrying out in the University of Granada. The main objective of this work is thinking about learning processes that occur in current society and especially in the framework of Higher Education, trying to analyze the tools that compose the Personal Learning Environment of each student. In this research we try to relate the tools in the students' PLE with the stages of learning in the theory of learning of Gagné. This knowledge could guide us towards the improving of our teaching processes and students learning.

Keywords: Personal Learning Environment; Learning processes; Reflection process; Self-regulated learning; Higher Education

1 Introduction

Lately there have been an increasing number of people thinking that the learning environments based on ICT are evolving with the evolution of the users. We are in a society in which the relationships between people are strongly influenced by the technologies that they use, and this fact affects the way in which they confront their learning processes as well. These processes have stopped being fixed schemas that consist of several steps previously defined and become open situations chosen by learners and focused on their own needs. Thereby, current learners develop processes of knowledge acquisition that are self-centered and regulated by their own rhythms and styles of work. In addition, they are able to communicate and share all their experience with virtual communities at the same time. In our context, Higher Education, we are seeing all these characteristics in the current process towards the European Higher Education Area that try to approach the diversity of universities in a common framework. In this scenario, the methodological guidelines that universities have to follow are focused on the self-regulation of students, their active work in the learning environments, and the need of long-life learning as a tool of professional development.

This evolution in learners and their learning methodologies have to be translated into an evolution in their virtual environments. In this knowledge society, we look for information through the networking facilities available to us, and we can communicate and share our knowledge by using these technologies. All these possibilities are becoming the real learning environment which is handled in a natural and comfortable way by users. However, in the past few years, in most educational institutions, virtual

learning has been handled by Learning Management Systems (LMS) and nowadays most institutions have their own institutional virtual campus based on their LMS or even several, and different LMS coexisting together. Some authors have begun to think about the weaknesses of these systems, and pay attention in another more flexible and more customized learning methods. For example, Mott (2010) [15] points that many students, teachers, instructional technologists, and administrators consider the LMS too inflexible and are turning to the web for tools that support their everyday communication, productivity, and collaboration needs. Blogs, wikis, social networking sites, microblogging tools, and other web-based applications are supplanting the teaching and learning tools previously found only inside the LMS. Along the same line of thought, Camacho and Guilana (2011) [5] collect the ideas of some authors [10], [18] who argue that LMS reproduce the traditional teacher or institution-centered closed model, whereby students are simply managed into a standard production system. According to them, this circumstance has changed dramatically with the explosion of Web 2.0 technology and social networks, that produced the movement of users to an open platform in which they are connected by interests, participate in social networks, and create communities of practice generating a collective intelligence. Regarding the needs of collaboration and social participation, Dabbagh and Kitsantas (2012) [9] point out the idea that LMS do not capitalize on the pedagogical affordances of social media. For example, they do not allow learners to manage and maintain a learning space that facilitates their own learning activities and connections to peers, and social networks across time and place, so they can't take advantage of digital and networked technologies, not only to look for information, but also to share information.

In this situation we can think about looking for another types of virtual learning environment that collect all these desired characteristics in an open, collaborative and flexible way [5], [15], [20].

2 Theory Background

The main objective of this work is thinking about learning processes that occur in current society and especially in the framework of Higher Education. All we say in the previous section guides our reflection towards a scenario in which students learn in an informal and collaborative way, and take advantage of social networking and information and communication technologies. It seems that the idea closest to this scenario is the concept of Personal Learning Environments (PLE).

In a simple definition “a PLE is comprised of all the different tools we use in our everyday life for learning” [3]. This definition that sounds quite plain reflects the main ideas of these environments: self-regulation of the environment, adaptation to our own needs, including our daily services and tools (social and networking), and providing learning (formal and informal). According to Valtonen et al. (2012) [20] from the work by Attwell (2007) [3] and by Schaffert & Hilzensauer, 2008 [17]; the idea of PLEs is to set students in more central roles in two ways: first, students are allowed and encouraged to build and administer their own learning environments in ways that best suit their learning needs and purposes; second, the aim is to provide students with a more active role in the learning process, as self-directed agents taking more responsibility for their learning. These definitions and approaches emphasize the

pedagogy and not the technical tool or software, so the tools will be adapted to the needs of the user.

Following Valtonen et al. (2012) [20], we can stress on one hand the theoretical aspects that are behind the building of PLEs, pointing the facilities for self-regulating and personalize our own learning environment, and on the other hand, the capacities for developing collaborative learning. However, the students have to have higher order thinking skills for orienting, planning, executing, monitoring, and evaluating the processes of learning. Because of this, it is interesting to study how students build their own PLEs and what competences and skills they need for it, according to their own learning styles.

In our research in progress, we compare the characteristics of students' PLEs with the theory of learning of Gagné [11] in order to understand which mechanisms lead them to build these PLEs. We try to use this information to improve learning and teaching.

Gagné's theory try to offer a theoretical framework that could be used by teachers in order to improve planning the instruction. We are going to establish a relationship between this theory and the idea of PLE to improve the design and planning of our learning experiences using this type of environments.

Gagné studies simultaneously learning and instruction in his theory, since he thinks that they have to be studied together. He establishes that, in order to achieve certain learning outcomes, it is necessary to know [19]: a) the inner conditions that take part in the process and b) the outside conditions that may help an optimal learning.

In order to explain the inner conditions that take part in learning processes, Gagné makes a schema that shows the different stages in the learning process, taking into account that inner activities are closely related to outside activities and this will cause certain learning outcomes. The eight stages are [19]: motivation, understanding, acquisition, keeping, memory, generalization, implementation and feedback.

Outside conditions are defined by Gagné as those events that enable learning processes. Through the designing and planning of our learning environments, we can thus make these outside variables appropriate to develop the learning experiences. This theory addresses the organization of these outside conditions in order to achieve certain learning outcomes according to each learning process and style: ordering these variables to improve students' motivation, attention, acquisition …

Our main purpose in our future research will be to relate the widgets or tools in students PLEs to these outside conditions that are in their learning process. Thereby, most important source of information will come from the students through the representation of their own PLEs and the interpretation and categorization of each tool. We are going to collect all these information and analyze it in order to extract our conclusions. We think that this analysis could help us to organize the instructional design of our teaching experiences taking into account the steps of Gagne's theory directly related to the outside conditions that students mention as different tools and widget in their PLEs.

In this field of work there are a lot of researches and studies that have helped us to reflect in our own work and reinforce some issues. Thus, for example, the works of Berthold et al. (2011)[4] or Costa, Cruz & Viana (2010) [8] emphasize the importance of assign the widgets that learners use in their PLEs to their corresponding learning techniques in order to improve learning outcome and success on one hand, and on the other hand in order to recognize the importance of student's leadership in the

organization and management of their own learning. Moreover, studies such as Castañeda y Soto (2010) [7] or Wild et al. (2009) [21] have been dedicated to analyze the fundamental elements that have importance in the building of PLEs. In the first case, they obtain as one of the main conclusions that *"experiences of success related to the use of these tools in learning processes are associated with a mix between a strong learner centered methodology (vital) and a good catalogue of tools"*. For their part, Casquero (2010) [6] and Wilson et al. (2006) [22] offer alternatives in the building of PLEs that mix the institutional part with the access to the web in the first case. In the second case, they emphasize symmetric connections with a range of services both in formal and informal learning, work, and leisure, and identify strategies for implementation and experimentation.

3 Methods of the Research

In this work we describe a research in progress in which we try to find out whether reflection on their Personal Learning Environment improves students learning process and teaching development. We study this from two different points of view:

- From the student perspective*:* From the student point of view, the main goal is to become aware of their own learning process. Developing, analyzing and evaluating their own PLE make the student reflect on their process of knowledge acquisition. Therefore, for the students the building of their own PLE becomes a powerful metacognitive tool.
- From the teacher perspective*:* We analyze the PLEs built by the students in order to develop resources that take into account the tools in these PLEs. At the same time we will be able to promote the collaborative learning with the appropriate strategies. In short, we study the learning environments of our students in order to understand the way in which they acquire their knowledge and use this information to improve our teaching in the designing and planning of the processes and the interactions.

The points above will be the two main goals of a future wider study, in which we will analyze the PLEs showed by a set of students at the University of Granada.

Here we primarily intend to exchange ideas, experiences, and researches on the reflection of the students on the building of their own PLEs. The key is to find out how one can contribute to the development and implementation of their own PLEs through self-reflection on their learning processes. In order to do this, we propose to study an experience will carry out at the University of Granada. For our experience we will use two courses with students (about 120) of a degree in Education in the Faculty of Education Sciences. The students will be in the second year of the degree in a subject related to the use of ICTs in Education. We consider that this is the right subject to do this experience due to the contents are focused on provide students with technical resources to improve their teaching skills. This fact could enrich their PLEs throughout the course and we could track the changes on it.

The procedure chosen for this analysis includes the development of an activity proposed by the teachers at the beginning of the course in which students have to develop a concept map of their own PLE. It is considered that the creation of concept maps allows students to organize and relate contents. It is a technique that allows the

knowledge organization and representation and so, students can learn significantly a discipline by doing them [16][12].

At the end of the course, in a subsequent step, the students should think about their PLEs and about its evolution and they will do the concept map again with the changes. The reflection process on their PLE is more important (or nearly as important) as the building process.

The reflection is a deliberate and careful consideration of previous actions, events, experiences, or decisions, and the thinking that accompany these activities. In this research the main starting point is the idea that it is useful to reflect on PLE, because the lessons learned from reflection can be useful to guide and inform future practice. It is also true that learning processes are favored by reflection. However, to improve the learning processes, the reflection on PLE is necessary but not sufficient. Nowadays trying to solve the question about whether the reflection on PLEs improves the learning processes is a fundamental target. In order to try to answer this question, we relate the essential components of a PLE (tools for reading, thinking and relationship) with Gagne's eight stage of learning (motivation, understanding, acquisition, keeping, memory, generalization, implementation and feedback). Students could categorize each tool in one or several stages. This could serve them to know what stages are the weakest and look for tools that help them in these ones.

In order to reflect on the tools that make a PLE it can be useful to think that this concept generally includes three basic elements [1]:

- Reading tools and strategies: the information resources that offer this information as objects (media libraries);
- Reflection tools and strategies: the environments or services to which the information can be converted (sites where to write, comment, analyze, publish) and
- Relationship tools and strategies: environments to relate with other people to learn from or with.

In a previous study, Amberg et al. (2009) [2] investigated the development of the learning process into the creation of a PLE. The learning process based on web to create a PLE was described according to the categories: Browse - Link ("do network") - Collect - Create - Communicate (synchronously and asynchronously) - Share (collaborative development of resources or contents). We'll try to relate the tools used in these categories for defining the PLEs with the stages that we mentioned before.

In our research in progress, we study and analyze how students build their own PLE and which are the main tools that constitute it. We understand that we are in the construction and reconstruction stages following a natural evolutionary process. We ask ourselves whether being aware of the tools in their own PLE encourages students to acquire new tools. We also wonder if this circumstance helps them to be more aware of their ways to learn and so they can intentionally chose which tools can be useful in their learning process.

This study will have several steps that we can summarize as follow and will carry out during 4 month of classes:

- At the beginning of the course students draw a concept map with the main tools that form their own PLE. We recommend them to make it with the tool CmapTools[1].
- At the same time, we ask them to reflect about the building of this environment and fill in a questionnaire that we will elaborate, in which they will have to establish relationships between the tools in their PLE and the stages of learning of Gagné. So, they relate each tool to a stage of their own learning process.
- We analyze the information collected and could define profiles of tools depending on the stage of learning in which they were used.
- We could reinforce using certain tools in certain stages of learning if we consider that these tools could improve learning process according with the opinion of students.
- We could plan and implement strategies of learning that take advantage of these tools in those stages of learning.
- At the end of the experience, we ask the students to draw the concept map of their own PLE again. The objective is that they reflect about the changes that their PLE has suffered since they are conscious of the tools that made it up and the stages in which they use them. We will ask them specific questions about it to guide this reflection.

We have to build the instruments that we will use in this research (questionnaire for relating PLEs with stages of Gagne's learning theory and questionnaire of reflection about the final PLE) but the process is going to be structured as we described above. We will make a list of tools that usually students use in each stage of learning. Thus, we could advise students to manage certain tools in certain stages and we could plan our instructional designing according to this.

4 Some Examples of Future Analysis

This current academic year we have begun to collect conceptual maps of students in our subjects to guide all this research and our teaching strategies as well. We only asked students to make a conceptual map of the tools that they use in their daily learning at the beginning of the subject "ICT applied to education" in some courses of an Education degree.

As an example we show the following map (Fig. 1) in which this student classifies the tools in eight categories: Studying; following; learning and knowing; searching; images; audiovisual leisure; reading; and communicating and sharing. For our future analysis we would have to relate these categories with the stages of Gagne's theory or each tool with the stage. In order to do this, we will develop a questionnaire that students will fill at the same time that they are making their map.

[1] Available in http://cmap.ihmc.us/

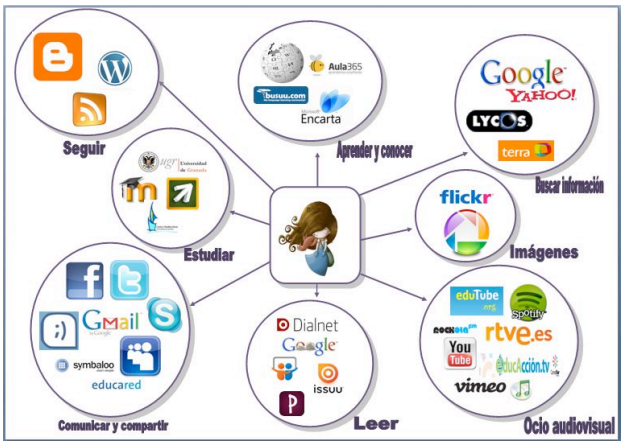

Fig 1. PLE before subject ICT applied to education

At the end of the course the same student made this map in which new tools were added to their PLE as we can see in the next figure (Fig 2.) in the categories: collaborative work, resources search and resources developing. These tools were highly related to the contents of the subject.

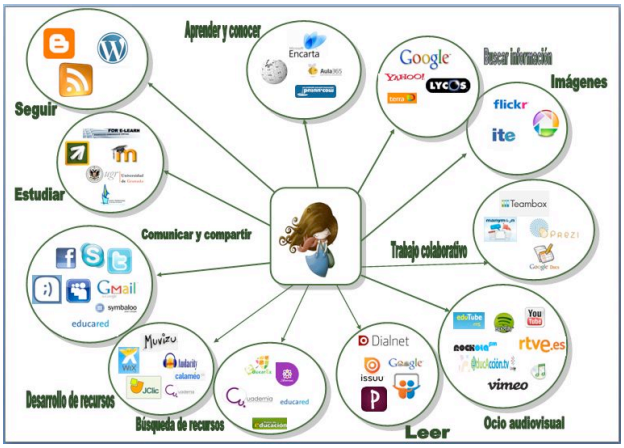

Fig 2. PLE after subject ICT applied to education

In a preliminary overview of the main tools that our students pointed in their PLEs, we can make the following list only as a starting point of our research and as a reflection of their learning styles:

1. Google (Gmail, maps, books, chat…)
2. Microsoft Office
3. CmapTools
4. Digital newspapers
5. Facebook

6. Tuenti
7. Twitter
8. Messenger
9. Hotmail
10. Blogs (blogger, wordpress)
11. Podcast
12. University of Granada Tools
13. Skype
14. Picassa
15. Flickr
16. Spotify
17. Youtube
18. Prezi
19. Outlook
20. Wikipedia, Wikiloc
21. Linkedin
22. Laboris
23. Infojobs
24. Wordreference
25. Delicious
26. …

In order to improve our teaching and planning experiences we could relate each tool and each stage of learning to the Gagne's Nine Steps of Instruction. Thereby we can try to use in the several steps the tools that students already use more frequently. The nine steps of instruction are according to Gagne: 1. Gain attention, 2. Describe the goal, 3. Stimulate recall of prior knowledge, 4. Present the material to be learned, 5. Provide guidance for learning, 6. Elicit performance "practice", 7. Provide informative feedback, 8. Assess performance test and 9. Enhance retention and transfer.

5 Conclusions

In the current society the importance of the relationships established through networking and the access to the information and knowledge, are influencing the developing of learning processes. The learning environments are becoming more flexible and decentralized than ever. In these scenarios all the processes are centered on the students and their interactions.

Knowing the way in which students build their own PLEs seems to be an important task to understand their styles of learning and to develop teaching strategies according to those styles. It is important to take advantage of this information not only for teaching purposes but for the reflection of students in their own learning.

The goal of the research explained here is to study in depth this issue. We are currently starting to do some previous studies and preliminary analysis. In these studies we are seeing that students are not very conscious of the tools that they use in formal and informal learning until you ask them to reflect about it. But it's almost a general issue that all the PLEs of the students are much enriched after the course. The tools and widgets that they learn in the subject are added to their PLEs. This could serve them to enrich their learning environments and incorporate new tools that could

help them in all the stages of their learning processes but in those in which the students had more problems above of all.

At the same, time we could learn more from the tools that students need in their learning process. This fact could help us in the instructional design of our subjects by using the tools that students use in certain steps of their learning.

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