

People have always had a personal environment from which they learn, even though they haven't necessarily been conscious of it nor have they needed to be. In fact, the scarcity and the specialization of sources of information made that a completely centralized model, based around the teacher-expert who provided the learners with the relevant information, was more than enough, even when they went on learning outside it.

Nevertheless, due to the arrival of Internet, the technologies of the so-called Web 2.0 and the popularization of the mobile access to information things have changed. We find ourselves in an educational era which Weller (2011) calls 'of abundance'. Now people can immediately and easily access all information which in other times constituted the major proportion of school education (the contents) and they can also comment on, edit and debate it with other people. The information they have access to has been considerably multiplied. Almost everything they may be interested in is just a click away.

People can access a huge amount of information, resources and conversations about almost everything, stemming from diverse sources, with heterogeneous perspectives and numerous origins, in an extraordinary variety of formats. They can 'manipulate' all this information so that it reaches them having passed through many filters and it reaches them at whatever time fits them best, in the device, language, form and place they choose. That means that experiences, exchanges, activities to which the use of technologies has brought them closer have extraordinarily multiplied, diversified and personalized the learning environments, to the point that centralized and common learning environments are insufficient and impoverishing.

Some authors, such as Collins and Haverson (2010), state that there are some incompatibilities between the society which learns from technology and the society which learns exclusively using traditional methods: uniform learning versus the possibility- and the necessity- of customization, the notion of the teacher as the only expert and key source of all valid and relevant information versus the proliferation of diverse sources of information, the obsession with a standardized evaluation versus the need of specialized assessment which fulfills the customization mentioned previously, the belief that knowledge is in people's heads versus the evidence that knowledge depends on outside resources with which they establish relationships, the perception of relevant knowledge as something that is acquired entirely or largely in an institution or from a certain type of information sources versus the knowledge explosion and fragmentation in digital and online tools and, finally, the change of school paradigm, from a pedagogy which supports learning by acquisition versus a view of education which focuses on learning by doing and, above all, in learning to learn giving us an ability to continue learning all our lives.

Taking into account all the previous considerations, it is coherent that the concern about the learning processes, inside and outside the classrooms, has significantly increased. The natural environment of our interactions has expanded to the information network we have globally created in the last decades. And it is here, in this new reality, where the interest for the study of Learning Personal Environments appears.

2. THE PLE, A USEFUL IDEA ABOUT HOW WE LEARN

The concept of PLE is said to date back to 2001 when, within the framework of the NIMLE project (*Northern Ireland Integrated Managed Learning Environment*) financed by the JISC (the *Joint Information Systems Committee* from Great Britain), the idea of a student-centered learning environment begins to be developed as an evolution of the then already popular Virtual Learning and Teaching Environments, embedded in the institution. An environment which could gather and centralize resources from diverse institutions (Brown 2010). Some years later, in 2004, the JISC included a specific session in its annual conference devoted to telematics environments focused on the student which were called Personal Learning Environments. That was the first time that the term was 'officially' used, later becoming widespread and evolving, and its acronym being used in almost every language: PLE.

During the first years two schools of thought coexisted around the concept of PLE. On the one hand, the direct heir of the ideas outlined in the NIMLE project and in the session of the Conference in 2004 by the JISC, which understands PLE as technological devices whose objective is to create and generalize the best possible learning tool (Wilson, 2005, 2007; Van Harmelen, 2006, 2008; Taraghi et al. 2009; Vavuola and Sharples, 2009; and in our country, Casquero et al., 2008). On the other hand, the other school of thought is supported by many authors (Attwell, 2007, 2010; Waters, 2008; Downes, 2010, Adell and Castañeda, 2010, among others), which understands the PLE as a pedagogical idea about how people learn using technology.

Since that first meeting in 2004 a lot has been said and done regarding the issue of PLE. At the time of this publication, there is already an interesting critical number of articles in specialized magazines (a great sample was compiled by Buchen, Attwell and Torres-Kompen in 2011). However, the development of the ideas about PLE is in itself an example of that new way of conceiving the online networked-learning environments: a collective and open process. It started with more or less informal debates at a global level which were reflected specially in forums and blogs, to later consolidate in the traditional ways of scientific diffusion: papers, articles in magazines and, now, monographs.

Two of the first scientific publications with a great impact which devoted a monograph to the issue of PLE were the *International Journal of Interactive Learning Environments* (in May of 2008) with a clear tendency to the technical description of what a PLE could consist of (the articles by van Harmelen, Wilson and by Johnson and Liber should be emphasized) and the *eLearning Papers* magazine which, although already in January of 2007 published a specially thought-provoking paper signed by Graham Attwell (Attwell, 2007), in July of 2008 devoted a complete edition in which a more pedagogical view of the issue was proposed (in this case the editorial by Ehlers and Carneiro, and the paper by Underwood and Banyard should be highlighted). After them, many publications have deepened and expanded the thought and the practical experiences about PLE. In 2010 a magazine whose title made reference to the issue appeared, the *International Journal of Virtual and Personal Learning Environments*, although with less impact, perhaps due to the fact that not all its contents dealt with the topic and to its exorbitant price.

Despite the fact that the issue of PLE had begun to appear little by little in conferences and general scientific meetings about educational technology, the first *PLE Conference* (<http://pleconf.org>) in 2010 in Barcelona was a turning point leading to a periodical forum, devoted exclusively to PLE. In this forum the issue was not dealt with in a general way as something related to educational technology, but as a core idea from which other issues could be analyzed. In the three editions of this conference (until the date of the edition of this book) an evolution in the treatment of the concept and its development can be noticed, as will be commented on briefly below.

In the first edition (2010 in Barcelona, Spain) the discussions were focused on analyzing what a PLE was, taking into account the same parameters of the origin of the term. It was intensely discussed whether it was a technological concept 'or' a pedagogical one (as it is evident in papers such as the ones by Fiedler and Våljataga¹, Fournier and Kop or in workshops such as the one led by Reinhart, Couros, Costa and Buchem titled *Collaborative mindmapping of the PLE definition*). It was also debated which ones were the components of a PLE and the role of social networks in this new setting (such as in the paper by White et al., or in the workshop led by Paulo Simoes titled *Twitter - The heart of your PLE*). Furthermore, there were many discussions about whether an institution could or couldn't include PLE as a part of its strategy or whether it was understood that PLE and formal teaching were irreconcilable ideas (issues which had an impact on the two *unkeynotes* led by Alec Couros and Graham Attwell, and Ismael Peña-López and Jordi Adell, and in papers such as the ones by Casquero et al. or by Santos and Pedro).

In the PLE Conference in 2011 (Southampton, United Kingdom) many agreements had been reached. Topics such as the use of online learning tools in institutions, understood as part of the PLE, were openly debated, as well as the way to help students to shape their own PLE (evident in papers such as the ones by Millard et al., or by Conde et al.). Likewise, other issues such as the technological evolution, which makes easier the management of PLE, were analyzed more deeply- understanding that the PLE is a pedagogical perspective which necessarily implies technology (such as in the papers by Ullmann et al., by Kroop, or by Akbari, Herle and Heinen). Moreover, in this edition we can find some of the latest contributions about acronyms closely related to the concept of PLE (Rubio et al.), the learners' and teachers' competences when developing PLE were discussed (as it is evidenced in the proposals by Valtonen and Kukkonen, by Akbari and Thüs, by Ivanova and Chatti, by Shaikh and Khoja, by Simmons and Edirisingha or by Castañeda, Costa and Torres-Kompen), and more proposals and experiences on the use of PLE in formal and non-formal courses appeared (such as the experience of Torres-Kompen and Edirisingha, of Tur, of Marín and de Benito, or of Hunsinger).

Finally, in 2012 (in Aveiro, Portugal) the agreements already reached (like the ones related to the concept, or to the unnecessary of new acronyms) allowed many of the discussions and proposals not to have PLE as an object of study but as a starting point and as an agent of change

¹ It is not the intention of this list to be exhaustive, it merely deals with examples, but the reader is invited to explore the trends evidenced in this chapter in the minutes of the conference which are available in the url <http://pleconf.org>

of the papers. Thus, in this edition we can find deeper contributions about the development and analysis of the concept of PLE in educational formal and informal contexts (Mikroyanidis and Connolly, Tur and Urbina, Ivanova, Grosseck and Holotescu, or Castañeda and Adell), the use of online resources to manage and represent PLE (such as the paper by Marín, Salinas and De Benito, or by Pedro et al., or by Hölterhof, Nattland and Kerres) and even some of these contributions and proposals analyse the relationship between PLE and other closely related theories and concepts (the case of online identity in the paper by Aresta et al, of customization culture in the one by Mizta and Chaterjee or of the psychological ownership and learner control theory in the one by Buchem).

Consequently, as the years have passed and the debate around PLE has increased, those two initial trends previously mentioned and which seemed irreconcilable have weakened and converged in more central positions. Therefore, today it is stated that 'the PLE is a pedagogical approach with enormous implications in the learning processes and with an irrefutable technological base. A techno-pedagogical concept which takes advantage of the undeniable possibilities offered by technologies and emergent social dynamics taking place in the new settings defined by these technologies' (Attwell, Castañeda and Buchem, in press releases), or what is the same, an idea which helps us to understand how people learn efficiently using the technologies at their disposal.

But from this perspective, what exactly do we understand that a PLE includes?

3. CONCEPT AND COMPONENTS OF A PLE

The definition proposed some years ago (Adell and Castañeda, 2010) is considered to be comprehensible enough to offer a setting from which to analyze more deeply what a PLE is exactly and what it implies.

It was stated that a PLE '*...was the combination of tools, sources of information, connections and activities each person uses regularly to learn*' (Adell and Castañeda, 2010, page. 23).

That is to say, the PLE is shaped by the processes, experiences and strategies that the learner can-and must- implement to learn, and in the current social and cultural conditions, it is determined by the possibilities that technologies open and potentiate. That implies that nowadays some of these processes, strategies and experiences are new, they have emerged thanks to the new information and communication technologies, but it also implies that they should be regularly used and serve to enrich the manner in which people learn individually and collectively.

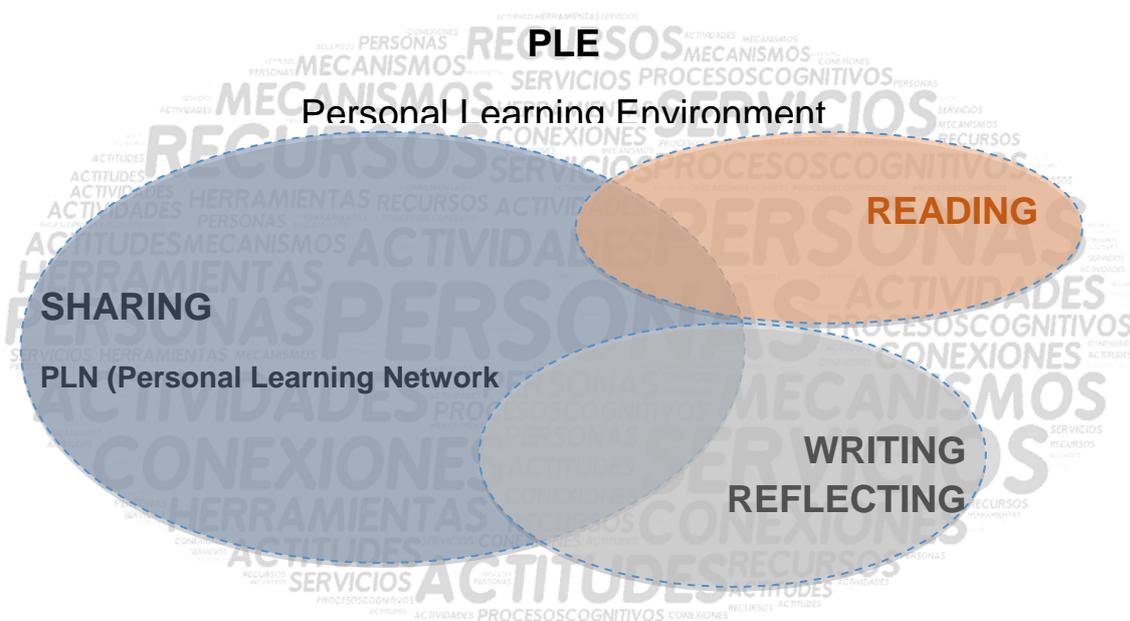
The PLE consists of, apart from the classic experiences which shaped the formal learning, the new experiences which are opened to us by current technological tools, such as the applications and services of the web 2.0, and the emergent processes-individual and mainly collective- of that learning ecology.

That implies that, if in that first work (Adell and Castañeda, 2010) PLE were defined and in a following one teachers' professional development was tackled from the PLE perspective (Castañeda and Adell, 2011), PLE components were:

- “1) Reading tools and strategies: the sources of information people have access to and which offer them that information in the shape of objects or devices (media libraries);
- 2) reflection tools and strategies: the platforms or services in which people can transform information (online platforms where they write, comment on, analyze, reproduce, publish), and
- 3) social tools and strategies: online communities where people can establish relationships with other people learning from and with them”.

We consider it essential to advance defining better the part of strategies.

In the PLE 3 main parts are included:



3.1. READING TOOLS, MECHANISMS AND ACTIVITIES

The first components of PLE are the documentary sources of information and people's learning experiences, understood as their particular knowledge sources, as well as the platforms and mechanisms they learn from and from which they regularly or occasionally extract information in different formats. These components are our *reading* platforms, in the more multimedia meaning of the word.

Thus, we are not only referring to *newletters*, high impact blogs, online video channels or RSS lists where people normally have access to information, but also to mechanisms and experiences which allow them to carry out the following: text scanning, headlines review, attendance to conferences, educational use of audiovisual resources.

Reading/ Acceding to the information	Tools: newsletters, blogs, video channels, RSS lists, etc.
	Mechanisms: search, curiosity, initiative, etc.
	Activities: conferences, text reading , headlines review, learning use of audiovisual resources

And from a more pedagogical perspective, we are also referring to attitudes and aptitudes for searching curiosity, initiative and independence when undertaking those information searches in a permanent way, even when they don't meet any particular need.

3.2. TOOLS, MECHANISMS AND ACTIVITIES FOR DOING/REFLECTING WHILE DOING

The second component of PLE, which refers to modifying the information, integrates those tools and platforms in which learners do things with the achieved information, the platforms in which they make sense and restore knowledge after reflecting on the information. But the mental processes we carry out to do so are also included, mechanisms of reflection, reorganization, prioritization, editing and publication of information, as well as the attitudes related to those kind of processes and the way they are carried out.

Consequently, we refer to online platforms where people can edit and publish the achieved information: our blog (in text, video or multimedia format), a website for uploading videos, our profile wall in social media, or simply a notebook. However, we also refer to the processes which unleash this editing and those which nourish it- processes of synthesis, reflection, organization, structuring, etc.-, as well as attitudes which encourage their implementation.

Doing/Reflecting while doing	Tools: blogs, notebooks, video channels, visual presentations online editors, webpages.
	Mechanisms: synthesis, reflection, organization, structuring, etc.
	Activities: creation of a daily report, elaboration of a mind map, publication an own video, etc.

3.3. TOOLS, MECHANISMS AND ACTIVITIES TO SHARE AND REFLECT WITHIN THE COMMUNITY: THE PLN (PERSONAL LEARNING NETWORK)

Probably one of the most relevant aspects of the PLE definition previously discussed is that those learning sources, mechanisms and attitudes we constantly made reference to, are not restricted to the documentary and individual ones. This definition also includes people as knowledge sources and social interactions as experiences which enrich people's knowledge.

That is to say, the PLE is not only understood as an individual concept constituted by each person and 'his/her personal things', but also as a social learning environment (Personal Learning Network or PLN, which is its acronym and the most common way the concept is found in literature), with its sources and relationships as a fundamental part of that environment.

Thus, the PLE is said to be integrated in the PLN, that is, *the tools, mental processes and activities which allow people to share, reflect, debate and reconstruct knowledge- and doubts-collectively, as well as the attitudes promoting and nourishing that exchange.*

And what is more, taking into account the current technological and social time in which we find ourselves, it is probably this part, the social part of our learning environment, the most important part of PLE.

Therefore, it could be reasserted that the PLN is shaped by people's activity in social tools (Buchem, Attwell and Torres-Kompen, 2011), either through their publications (social media), through sharing experiences (tools for monitoring the online activity) or through direct relationships (social media in the strictest meaning of the word) (Castañeda and Gutiérrez, 2010).

Sharing	Tools: social software tools, online activity monitoring, online social communities. In general, all the tools with an underlying social network. Mechanisms: Assertiveness, capacity of agreement, dialogue and decision-making, etc. Activities: meetings, forums, discussions, conferences, etc.
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Moreover, those social exchange opportunities (meetings, forums, conferences, etc.) which help people to enrich that PLN should be included in our definition of PLN, as well as the mental processes implemented in those exchanges: decision-making capacity, assertiveness, etc.

This PLN requires certain competences related to personal identity within the networked environment (Castañeda and Camacho, 2012), that is to say, at same time that people build, extend and manage their PLN, they must develop a bigger and better awareness of their own personal and professional identity (increased by the technological platforms they visit), since only with a reliable identity can that network be strengthened to support people's learning.

4. GENERALIZATIONS AND CROSS-CUTTING ISSUES

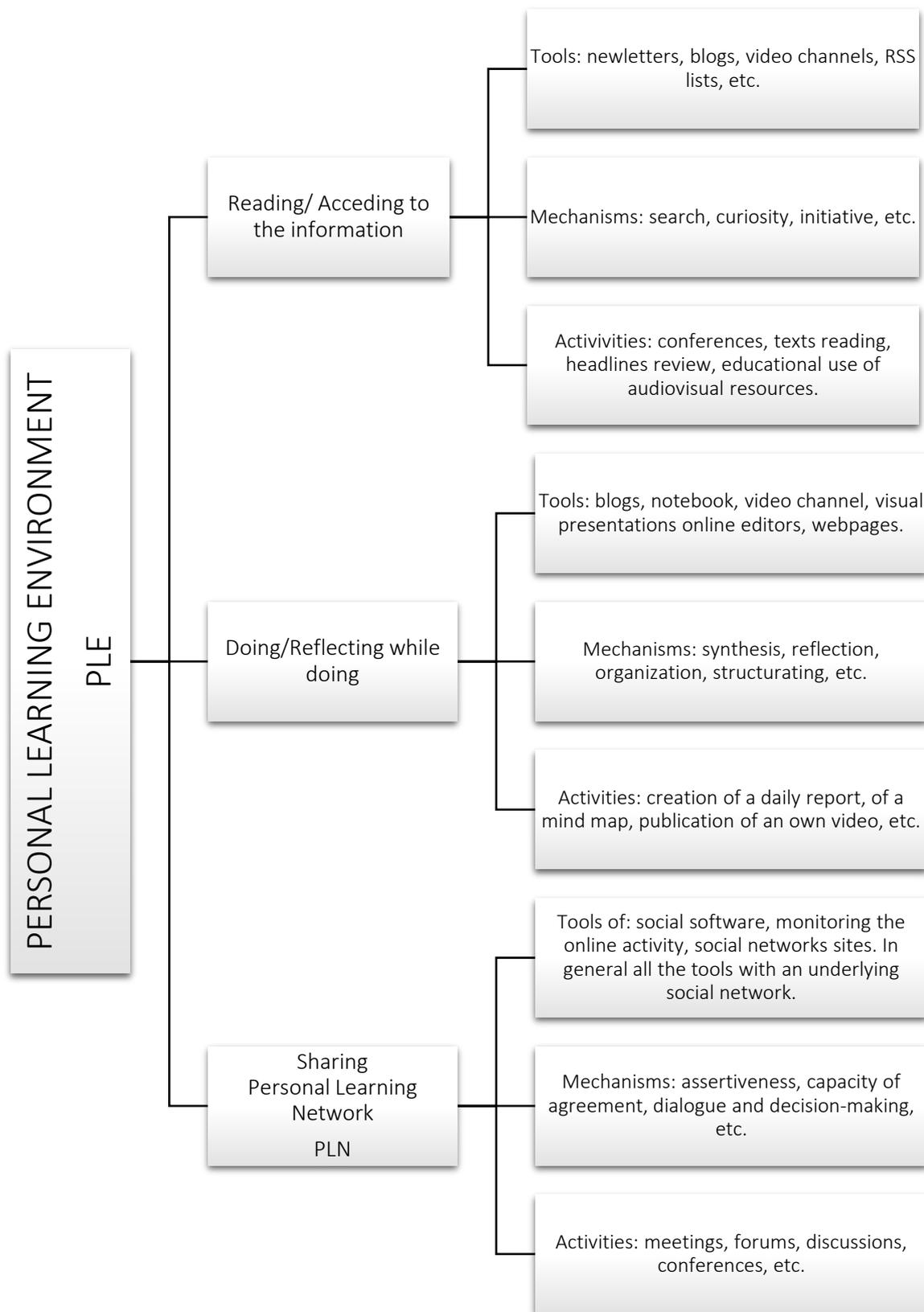
There are no tools, neither strategies nor mechanisms which could be considered as exclusive of one unique part of PLE. Each one of them, depending on how they are used, as well as the time in which we find ourselves, could form a part of one learning strategy or another.

For instance, despite the fact that a blog is a tool which allows people to edit and publish information online individually (writing/reflecting), if that blog has a more or less considerable involvement of its usual readers which comment on it, then it is an important part of people's PLN. In other words, a blog can be included in a PLE as a personal diary or as a chat community. Likewise, a face-to face learning experience, a seminar for example, can serve people both to know new sources of information (reading) and to increase their personal contacts, which are included in their PLE through the tools used to follow other people's experiences (sharing), increasing for example their contacts in Twitter with the speakers and participants of the seminar.

In the same way, there are mechanisms which are specific of particular parts of the PLE, such as when we refer to debating and reaching an agreement as typical mechanisms when sharing (PLN), but it is also true that many of the mechanisms which already enrich other parts of the PLE in its more 'individual' parts (synthesis, analysis, proactive search) have an important role in this more social side of people's learning environment.

Furthermore, there are some mental processes which should be considered as cross-cutting processes of the PLE, in the same way they are cross-cutting processes of the learning experience itself and of the capacity of learning autonomously. We are referring to processes such as creating, self-regulating, being curious, and in general all those processes which go beyond the purely cognitive processes (Bloom et al., 1956) and are linked to the metacognitive and self-systems formulated by Marzano (2001).

That is to say, although there are three basic aspects which help people to specify their PLE-reading, reflecting-doing and sharing-, the tools, sources of information, connections and activities enumerated are not exclusively of one of those parts. In any case, what is being analyzed is how people learn, so the only 'rules' are those indicated by their perception while learning.



Components of the PLE

5. SOME CLARIFICATIONS ABOUT PLE

It has been said that people have always had a PLE which includes whatever they use to learn. That statement and its development (found in the previous section) may make us think that the PLE is something so absolute, inherent and comprehensive that all the interest shown in the issue now might not be understood. Or what is the same, if it has always existed, whether we were aware of it or not, everyone has one and it is shaped by everything they use, then why is it necessary to define it now? Why is it so important in our current educational day to day?

Well, firstly it should be re-emphasized that the PLE has always existed, but in a world where the sources of information are scarce (books, experts), centralized (school) and the knowledge inertia is considerable (it takes time to be changed, to be moved), the PLE does not provide relevant information. However, when we find ourselves in a technological world where information has been fragmented and dispersed in multiple platforms and formats, a world where almost everyone can create and provide information and where knowledge advances at a vertiginous speed, in this world defining, knowing, managing and enriching the PLE is a necessary strategy to learn efficiently. That is to say, although the PLE has always existed, it has acquired an own entity and relevancy nowadays, once its components have been multiplied due to technologies; that is why the *PLE is said to be the environment in which we learn using technologies efficiently*.

Moreover, when stating that everyone has a PLE, being aware of it or not, it is being emphasized that there is no need to be an expert learner or a pedagogical professional to have a PLE. Nevertheless, having it without knowing it or without knowing how to enrich/maintain it implies wasting its potential as a metacognitive tool. If people do not understand how they learn, it is very difficult for them to replicate with their learning mechanisms in similar situations or redirect and enrich them when facing a situation where we must learn new things. And that means a serious adaptability problem in a world where the need for learning is not only permanent (life-long learning), but also wider than ever (learning in more and varied aspects, during all our lives).

In that mentioned world it is more likely for today's children to move in more complex social contexts, difficult even to imagine, to change their jobs several times during their working life and, whatever their degrees were, to be employed in different jobs carrying out activities which nowadays do not exist. *Those new contexts and their problems, will surely require unprecedented answers* for which no formula can be anticipated to be studied now, instead it will require the ability to look for them, to find them and to rebuild them according to the specific context and to apply them, that being what a person can make with a PLE.

That means that technologies no longer play a merely instrumental role inside the educational system, going much further than being just the tools which make the already known educational model more efficient, making clear therefore the necessity for a radically different educational model. This does not mean that the school has to shape technologies to perpetuate its model making it more efficient (as it has done with the inclusion of Learning and Teaching Virtual Environments such as Moodle or Blackboard, digital whiteboards or e-books). On the

contrary, the social-technological context has to produce a new school model meeting the citizenships' formative needs. And in this setting, the PLE concept helps to generate a new school model.

And that in all levels of formal education.

Furthermore, if basic education is specifically in charge of providing the 'minimum cultural wage' (Escudero, 2004) which helps people to exercise their citizenship in the maximum conditions of happiness (Ríos, 2003), then it is essential that in that educational period students firmly tackle the development of their PLE. The minimum competences to develop during formal education, and particularly during the first school years, include the awareness-raising, the development and management of the PLE, which allows people -no matter what their vital expectations are- to educate themselves to exercise their full citizenship. PLE mean learning to learn in the digital era.

From this perspective, the teaching processes (not only in elementary education, but all the formal educational processes) are redefined. The importance no longer lies in what someone (person or institution) wants and is willing to teach in terms of contents, closed and fixed, but in what the learners want/need to learn and how they organize (or the teacher organizes) around them a learning experience/activity/task. That changes radically the initial approach, *the emphasis in the teaching processes* shouldn't be made in forcing the memorization of a predetermined list of contents, but in *providing useful learning opportunities which could encourage the development of the expected competences and emergent learnings* (Williams, Karousou y Mackness, 2011) based on the conviction that the known repertoire of solutions won't serve for many of the new problems they will have to face. That is to say, teaching should be focused on problems solving, and not only on the solutions to known problems.

Despite the fact that the PLE has always existed, it hasn't always been in the educational spotlight. In fact, when giving importance to the PLE in the educational context, the PLE *is understood as the main network of a totally different way of building knowledge*. It even corresponds to a very specific view of what knowledge is. When stating that people have a learning environment which they must be able to specify, manage and enrich, it is understood that knowledge is not something static that can be introduced in people's heads to be useful, but something dynamic which happens in community, recreating itself (in the sense of the social constructivism proposed by Vygotsky (1978) and which evolved later, in the Internet era, in the connectivism by Siemens (2005) and Downes (2005)).

That is why, suggesting the PLE as the center of educational processes (formal and non-formal) means in depth changes for all the participants in the educational process. However, in the same way, introducing the PLE as the fundamental axis of the processes can help to change and rebuild- sophisticating- not only the teachers' beliefs about which are the best teaching methods (Kim et al. 2012), but also the learners' ones about the nature of knowledge and their own learning (Schommer-Aikins et al., 2012). Using actively and intensely their PLE, learners should understand that nowadays they not only consume information, but they also create it and reflect about it in community.

Learners with a developed and enriched PLE have the chance not only to learn from others but also others can learn from them, and that implies a combination of abilities and strategies that must be implemented. For learners, clarifying, developing and managing efficiently their PLE is not only a huge possibility, but also an enormous commitment with their own learning and with the learning of others, with whom they have relationship through their PLE.

For all the previous reasons, it is understood that the only way to teach these types of strategies is practicing them, making the teaching activity account for everything we intend, demanding our students more independence and teachers more interest in promoting, more than in carrying out or imparting. However, this kind of teaching practices and methodological principles underlying them will be analyzed more deeply in the following chapter.

We live in times where the new educational tendencies move between two poles more or less opposite: on the one hand, massive training models which, in the style of evolution of distance teaching, gather more and more strength as a way of taking advantage of the economies of scale to which the network moves us closer (the so-called xMOOCs, in its diverse modalities (Rodríguez, 2012), as the ones which can be found in Udacity or Coursera, or the very famous *Khan-Academy*), and on the other hand, the methodological proposals which accept social learners, engaged, who read and choose on their own, but who learn in community through relevant exchanges (such as the experiences of the *Flipped Classroom* or cMOOCs). Both of them have their place within the PLE, as part of the sources of information of the PLE and as an ecosystem where the PLE is developed and enriched. However, it is in the new learning and organizational teaching methods where answers to society challenges can be found and it is in those methods where the PLE must be thought of as a main idea and cornerstone which will continue being crucial.

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