

Chapter 2

From Web to Web 2.0 and E-Learning 2.0

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ABSTRACT

In this chapter the authors analyze issues and ideas regarding the next generation of e-Learning, which is already known as e-Learning 2.0 or social e-Learning. They will look at the new learning tools that have emerged from the evolution of the Web, to the Web 2.0 paradigm, discussing their potential for supporting modern and independent lifelong learners. Even more important, the authors will justify the modeling of a new concept for the future of teaching and learning in the knowledge-based society in which we live. The conclusion will present a scenario for the evolution of the Web, the Semantic Web or 3.0 generation Web, which is emerging as a higher environment that will advance the design and development of e-Learning systems in promising new directions: machine-understandable educational material will be the basis for machines that automatically use and interpret information for the benefit of authors and educators, making e-Learning platforms more adaptable and responsive to each individual learner.

INTRODUCTION

With the arrival of the Internet it was possible to create virtual learning environments supported through models of bi-directional communication (synchronous and asynchronous), which justified the exponential increase of courses available online. Malvestiti (2005) established a non-conventional

distance-learning method and has since been earning increased attention from those responsible for the development of formal and non-formal learning systems and from people, who are concerned about responding to the needs of a knowledge-based society, which is demanding the need for lifelong training (Bottentuit & Coutinho, 2007).

Information communication technology (ICT) created new spaces for building knowledge. The virtual learning environment, traditionally orga-

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nized around learning platforms, began to make room for new resources and free services, which were available on the Web and could be accessed without any substantial computer knowledge. In fact, teachers and students involved in courses in the subject of e/b-learning, can today rely on a series of tools from the new Internet generation called Web 2.0. These are resources that are simple to use and do not need installation or constant maintenance. They encourage new ways of communication, expression and interaction, as well as enrich pedagogical practices, with activities such as: cooperative and collaborative work, writing stimulation, interactive and multidirectional communication, increased ease of use in data storage, creation of online pages, the creation of practice communities (Coutinho & Bottentuit Junior, 2007). Besides being free, these tools also allow knowledge to be published and shared with the rest of the academic community.

This range of tools and services opened new horizons for teaching and distance training. It provided the educator with alternative ways to use e-Learning courses, which minimized some of the traditional criticism of this model of learning. In fact, in this new generation, the learner has a more active and personalized intervention in their learning process. The possibilities of communication and interaction are greater, the bonds to a community are deepened, and the spirit of cooperation and sharing is increased (Martinez, 2003). After briefly examining the recent evolution of distance learning, this article aims to develop a set of principles relating to what we understand to be the next generation of e-Learning; this has also been called e-Learning 2.0. It will look at some of the emerging learning tools from the Web 2.0 and will analyze its potential in terms of training, and its implications on the future of learning.

PHASES IN DISTANCE LEARNING

It is possible to distinguish different phases in the evolution of distance learning. The first phase was characterized by teaching based on correspondence, that is, the teacher and the student exchange learning materials through the mail. With the emergence of audiovisual resources (educational TV, videos and cassettes), distance education moved into a second phase, providing students with alternative ways of learning; in fact, besides reading, students could hear and see pictures associated with their educational content, allowing teaching to better adapt to individuals' different styles of learning.

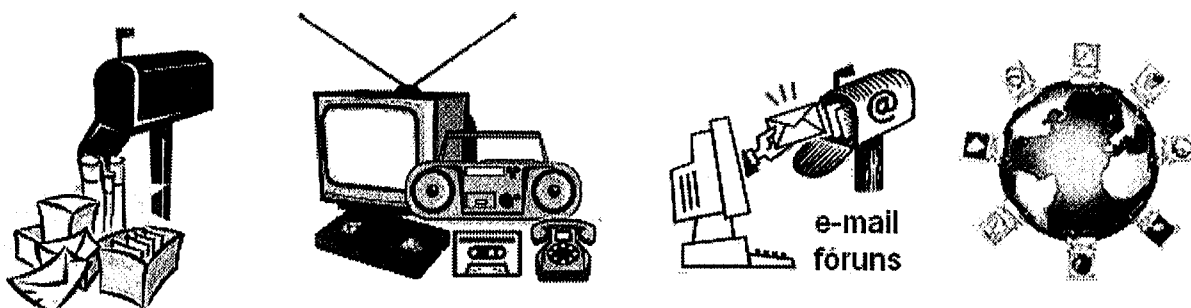
With the introduction of the Internet, distance learning stepped into its third phase, opening new spaces for learning and allowing synchronous and asynchronous communication between teachers and students. In this phase, the use of the electronic mail and chat tools quickly grew.

The fourth generation was marked by the replacement of scripted material (texts, notebooks and books) by digital multimedia material that could easily be accessed through teaching and learning environments and platforms (see Figure 1).

In this fourth and last phase, the process of teaching and learning was mediated by technology and therefore, new names for this new reality appeared such as, "e-learning", "online learning", "online training" or even "online education". According to Gomes (2005a) e-Learning can ensemble multiple situations from tutorial support to physical teaching but not all scenarios are effective for distance learning:

In this context e-Learning takes essentially the place of "electronic" tutorial to support students who fit in a scenario of physical teaching. The concept of e-Learning can also be associated with a complement between physical and distance activities, having as support the services and technologies available on the Internet (or another network) (Gomes, 2005a, p. 234).

Figure 1. Different phases of distance learning



The appearance of the Learning Management Systems (LMS) platforms brought numerous possibilities, both for teacher and student. Through these environments, it was possible to integrate into a single space, a series of services and tools, such as chat rooms, forums, attendance registers, exercises and online tests, which made a range of multimedia content available to them. However, what actually happened was that many of these environments and platforms were expensive, requiring payment for some kind of purchase license or maintenance contract.

According to Silva, Oliveira, Carvalho & Martins (2008), LMS platforms, of which Moodle is probably the most used, allowed course contents to be made available in a similar way to the trainer's Web site. However, it also made possible the use of new tools in the teaching-learning process, not only at the level of the asynchronous interaction (news, discussion forums, inquiry) and synchronous (chat) among students, but also in their evaluation (publication and reception of scheduled works, online evaluation tests, inquiries). In spite of all these new opportunities, it is argued that many students do not like to work with this technology, especially those who are not comfortable using it.

In 2001, Kathleen Gilroy argued that e-Learning faced a critical moment in its evolution. The computer-mediated distance training had turned into an important business for professional training and was at the top of the agenda of numerous

private and public universities that had invested strongly in the training market. However, most of the e-Learning courses had kept the traditional format: programs organized around the needs of the content providers, not around those of the individual learners. The outcome was that students were provided with homogenized, standardized content "course cartridges" and "e-packs". Thus, the problems traditionally associated with distance training, remained unchanged: low enrolments and high attrition rates stemming from user dissatisfaction (Martinez, 2004). Gilroy suggested a solution that meant creating groundbreaking learning environments, where the members of the online community could communicate and interact, establish relationships and learn with other members of the community. He defended his opinion, saying: "Learning is fundamentally both social and experiential" (Gilroy, 2001, online), an opinion shared by many other authors.

It is undeniable that the first Internet generation opened up the horizon for e-Learning. This was because it allowed access to a large source of contents that were free of charge and could be used and adapted to the profile of the user. However, it needed to develop further so that the burden for learning was not placed wholly on the shoulders of the learner. To succeed, the online training had to centre itself with the students and find ways to involve them in the learning process:

E-learning should be first and foremost about creating a social space that must be managed for the teaching and learning needs of the particular group of people inhabiting that space. When the focus is no longer the content but rather the management of the learning experience, then the pedagogical process becomes the most important factor in the design and support of that experience (Gilroy, 2001, online).

Impelled by the development of broadband, there was a revolution in the way we use, connect and interact on the Internet: the Web 2.0 generation opens new possibilities for education, mainly for the design and development of e-Learning models.

Today there are more flexible alternatives for the implementation of e-Learning models that can be adapted to the distinctive distance training needs of students, of companies and other institutions. Today there are free, easy-to-use tools that ask for an active role from the student, in the learning process. It is argued that there is great potential for the Internet's new generation tools — Web 2.0 — to flexibly and significantly contribute to minimize physical and time distances, so increasing the communication and interaction between the instructor and the trainee at any time and in any location.

THE EMERGENCE OF A NEW WEB PARADIGM

In Rosen's opinion (2006), every ten years new technological trends emerge: in the 1970s, mainframe computers appeared; in the 1980s, customer-server technology; in the 1990s, the Internet, and in 2000 onward, Web 2.0 was developed. The concept of "Web 2.0" began with a conference brainstorming session between Tim O'Reilly and MediaLive International (O'Reilly, 2005). They noticed that after the bursting of the dot-com bubble in the fall of 2001, the Web was

more important than ever. The companies that had survived the collapse seemed to have some things in common, and they called them Web 2.0, the second generation of the Web. Web 2.0 encompasses a variety of different meanings, which include an increased emphasis on user-generated content, data and content sharing and collaborative effort, together with the use of various kinds of social software, new ways of interacting with Web-based applications, and the use of the Web as a platform for generating, re-purposing and consuming content (Trechera, Mellado, Patino, & Huertas, 2008).

To Simão (2006), "the title Web 2.0 is not innocent and follows all the used terminology for updates and upgrades of computer programs. This means that Web 2.0 is an evolution of Web 1.0". Yet, what exactly was the evolution that justified the new title?

In Stephen Downes' opinion (2005), Web 2.0 is much more a social than a technological revolution; of greater importance was the new position and attitude of those accessing and using the network. In Simão's opinion (2006), one of the main and first characteristics of the new Web was the fact that the users, who before had a passive role, were now able to produce content. The ease of producing content and of placing it online, generated several developments: 1) the critical and active ability of the users who now had new ways to communicate with the world; 2) the ease of publishing, created communities that could gather around a common interest/subject leading to the creation of interpersonal relations that strengthened the sense of community; 3) the more people got involved in the production of Web content, the better the quality of the service. As membership increased, Web content was updated and validated to an even greater extent.

Another of the great innovations of Web 2.0 was that it allowed access to, and use of, online applications, which created a familiar working environment for the user. Users were able to update their own content information. This simplicity and

speed powered the generation of social networks, which are sites supported through databases that allow information to be kept and updated by an individual and to establish links between virtual or real friends.

Content aggregation and cataloguing allows the user of the network to create a personalized Web environment, adapted to their likes and needs. Content aggregation is possible through Really Simple Syndication (RSS) technologies, which allow the user to aggregate, on the Internet, small, chaotic pieces of content and organize them, thus creating their own systems of signification (Garrido, 2008). Information classification on Web 2.0 frees users from the classic rules of categorization of resources (taxonomy) because it allows a less linear and more similar classification to their thought processes. This is achieved through tags that can be translated for key-words or labels. A categorization system is developed by placing one link in more than one category simultaneously, so creating one folksonomy (Hayman, 2007). In practice, the new version of the Web is characterized by: a) focus in the contents; b) independent publication of contents created by the user; c) network effects due to participation-based architecture; d) social ware or collective user intelligence as a result of the contribution and shared experience among users with common interests.

In light of the above, the following question arises: with such panoply of applications and free services and with so many educative potentialities, should it not be expected that e-Learning evolved via the same route and that new opportunities were developed for online learning experiences?

FROM WEB 2.0 TO E-LEARNING 2.0

The term e-Learning 2.0 describes the new generation of e-Learning that followed the change of paradigm in the Web (Rosen, 2006; Voigt, 2007). In Garrido's opinion (2008, online), many teachers and instructors had already realized the potential

of Web 2.0 tools in the creation of innovative learning where:

The student/trainee has ... the possibility to contact with other students/trainees in other parts of the world, to research contents or share their own, that is, contact with the real world and be himself/herself the creator of meanings, therefore, of knowledge.

According to Silva et al. (2008), the benefits of Web 2.0 tools and services as an online learning environment, can be summarized as follows:

- Promotes better teacher–student relationships and communication, in a friendly environment;
- Helps students feel more comfortable about expressing themselves without embarrassment;
- Provides tools that stimulate students' enthusiasm in writing, forming opinions, peer evaluation through debate, a type of journal for peer review;
- Promotes collaborative work;
- Increases active intervention, which promotes students' self-confidence.

It is argued that the explosion in the popularity of this new Web paradigm was due to ease of access to the Internet and the wide availability of cheaper broadband as well as the ease of use of the content's creation tools with free applications from the Web. These applications will be soon be widely available, in several forms of hardware, due to the emergence of some innovative technologies such as AJAX1 and Flex2. The emergence of online distance education tools and e-Learning 2.0 has also been enhanced by the easy access to databases through JavaScript, Java or Flash, the language XML3 and RSS.

In fact, almost all characteristics of the Web 2.0 can be applied to e-Learning within Learning Content Management System (LCMS) or plat-

forms like Moodle. Interaction with, and among, students is more active and, because of this built-in interactivity, students are offered new possibilities to become involved in, and to interact with, the content (Balog-Crisan, Roxin & Smeureanu, 2008). To summarize, the key characteristics of e-Learning 2.0 are:

- The focus is in the contents (Silva et al., 2008);
- It allows independent creation, editing and publishing of contents created by the user (Karrer, 2006);
- The online exchange and sharing of information with the teacher and fellow students makes the course easier and simpler (Garrido, 2008);
- The production of micro-contents that are not exclusive to designers, teachers, instructors or, most importantly, to trainees (Leene, 2006);
- The contents produced by teaching professionals and non professionals can be searched and shared with the whole community (O'Hear, 2006);
- Network effects due to a participation-based architecture (Silva et al., 2008);
- Trainees can select and aggregate the contents to better adapt to their interests and needs helping to create and manage their own Personal Learning Environment (Graham Attwell, 2007), which Attwell believes, will be the future of e-Learning;
- The use of social software favours the integration of people and groups, easing communication and promoting collaborative working in the network (Rosen, 2006);
- The features of online communities diminish the artificiality due to the restrictions imposed by "discussions" in the traditional LMS; it allows for the creation of the true spirit of practice communities (Wenger,), since the discussion and sharing is opened up to all those with access to the Internet,

and to those who share the same interests (Downes, 2006);

- In terms of format, the e-Learning 2.0 courses, as suggested by Anita Rosen (2006), must be short but sophisticated in terms of design and versatility;
- Adaptive learning is created, which enables students to select their modular contents and to customize their learner-centric learning environments (Martinez, 2004, 2007).

For Stephen Downes (2006, 9) the new generation of "digital natives" or "n-gen", enjoy learning, work and leisure in a different way. They live in the age of the Web 2.0 and this means rethinking new models for e-Learning, models that will subtly combine formal and informal learning logic, which is essential to the success of any development of policy in lifelong learning. For "digital natives", communication is continuous, (Prensky 2004). They move from face-to-face interaction to online interaction very easily. They are accustomed to working in virtual teams and learning through simulation. Their multiple communication styles and their ease of using the Web have opened new ways for formal and, more important, informal forms of learning. We are already starting to see the impact in the workforce. According to Barna and Lenghel (2008), over the next ten years, higher education and workplaces will be flooded with technical and communication experts, expecting to develop their styles of communication. Teachers must be conscious that they are teaching a generation born in the computer age. Technology is second nature to these students. By the time they had started to walk, they were familiar with remote controls, computers, cell phones, and other technology. To teach this group effectively, educators must keep abreast of developments in digital and Web-based media and take advantage of the opportunities they offer to help students learn.

In 2007, the *Organization for Economic Co-operation and Development OECD* (2007)

published an extensive study on the key role of the content created by users in relation to the fast growth of the Web 2.0 and the social and cultural implications, and their respective impact, in the economic opportunities of their countries. As this study suggests, all the commercial agents have already understood the motivation of young people in relation to the use of the Web. They understand that content is created by users and so they are investing seriously in projects that aim to amplify this interest. The commercial and services sites are opening up to the idea that content can be produced by users, which has significantly increased all interactivity, adding value for customers. Education cannot ignore this reality: E-Learning 2.0 is essential if the quality and effectiveness of education and training systems is to be improved and to ensure that they are accessible to all.

Some E-Learning 2.0 Tools

In the world of education, Web 2.0 tools can be used to teach information literacy, collaboration with colleagues, implementation of student projects, and information sharing. A summary of Web 2.0 tool with the potential for e-Learning 2.0 is set out below.

A *blog* is a, “system that allows a single author (or sometimes, but less often, a group of authors) to write and publicly display time-ordered articles (called posts)” (Franklin & VanHarmelen, 2008, p.5). Blog sites like Blogger, Wordpress, Blogmeister, and Edublogs are some of the most popular. The blog is the ideal tool for the discussion and exchange of ideas on the network, allowing the creation of real virtual communities, who share interests at several levels (Gomes, 2005b). Blogs can be used individually or collectively and are very versatile in terms of pedagogical exploration, and very easy to conceive and to update. In an e-learning 2.0 scenario, the trainees can use blogs to express their ideas and to comment on blogs from colleagues, thus creating an intense network of interactions that, in Downes’ opinion (2006),

resembles that of the practice communities that Wenger (1998) talks about. In the context of higher education in Portugal, the use of blogs to create digital portfolios is probably the most used and investigated tool and has very promising results (Brescia & Miller, 2006; Coutinho, 2006; Coutinho & Bottentuit Junior, 2007a, 2007b).

A *wiki* is a “system that allows one or more people to build up a corpus of knowledge in a set of interlinked Web pages, using a process of creating and editing pages” (Franklin & VanHarmelen, 2008, p.5). Wiki sites like PBwiki, Seedwiki and Wikispaces are often the top choices among educators. Factors that may influence the choice of a wiki site may include lack of advertisements or ease of account creation. In education, wikis can be used for discussions, brainstorming, collaborative projects, or sharing lists. When training teachers, some discussion points may include how/whether or not to limit access, Internet safety and ethics, and roles/permissions of users. To E-learning 2.0, a Wiki: a) allows the accomplishment of collaborative works to the level of an entire group (repository of lessons, re-creation of manuals, glossaries); b) allows the dynamic interaction between both colleagues and teacher (by the inclusion of commentaries, suggestions, corrections); c) allows users to see the history of all the modifications, allowing the teacher/instructor to evaluate the evolution, and d) allows the creation of structures of knowledge shared in a learning community (Santamaria & Abreira, 2006; Qian, 2007).

Media Sharing Services, store user-contributed media and allow users to search for and display different types of contents (VanHarmelen, 2007). Examples of media sharing services include podcasts, videocasts, video sharing, art sharing, and document sharing. Podcast tools such as Audacity or Apple’s GarageBand allow users to easily create an audio podcast, while free podcasting hosting sites, such as Switchpod, allow for easy publishing. Teachers may use podcasts to record and publish lectures, practice world languages, record readings or announcements, and record

stories or poems (McCombs, Liu, Crowe, Houk, & Hitgginbotham, 2007; Pastore & Pastore, 2007). Videocast and video sharing tools such as youtube or teachertube allow users to easily upload and comment on videos. Teachers may use these tools to supply videos of experiments before lab sessions or to aid in distance learning. Newer tools such as Flickr (photo sharing), Devianart (art sharing) and Scribd (document sharing) allow users to collaborate and discuss the media. When training teachers, it is important to discuss the tools, review editing features, and demonstrate the posting of shared media. It is also important to review copyright rules and ensure that media is posted legally.

Social Bookmarking is a Web-based service for saving and referencing Internet Website favorites. Bookmarks have been available for many years, but social bookmarks that conform to the RSS information sharing standard, have emerged very recently (Fryer, 2005). One free example is Del.icio.us (<http://del.icio.us>), a Website that allows users to (through the use of “bookmarklets”) save desired Website addresses and categorize them quickly, with one or multiple “tags”, which are user-defined. As a social bookmarking service, the del.icio.us Website indicates how many other users have links to a particular Website address, and allows users to link to the social bookmarks of those other users. Social bookmarks can be an invaluable aid in student research projects, teacher technology workshops, and for personal use in keeping track of and sharing of valuable Internet resources. According to Fryer (2005), since the del.icio.us site “speaks” RSS, any “tag” (topic) in a person’s social bookmarks can be syndicated/subscribed to using an aggregator like Bloglines. The sharing of Website favorites/bookmarks has never been so easy, powerful, cheap and fast.

Social Networking refers to systems that allow people to network together and share web resources (VanHarmelen, 2007). Some of the more popular social networks include Myspace, Xanga, and Facebook. For younger students, Club

Penguin and Webkins provide age-appropriate social networks. Virtual worlds such as Second Life are also considered social networks. Students and teachers may use Myspace, Xanga or Facebook to network with friends or colleagues and to communicate on college or school campuses. Second Life activities range from simple study group activities to collaborative development of online spaces (islands). When training teachers in the use of social networking tools, it is imperative to speak of privacy rights as well as to review ethical and legal use of such tools.

Another interesting tool of the new Web 2.0 generation is the *Google Calendar*. It is an online agenda and calendar service offered free by the Google Company. Available in a Web interface, it allows users to do a range of functions including: to add or to control events, make commitments, share programming with other people, and add other public agendas of their own. This tool can be served in several e-Learning activities - for instance, the online tutorial – to set appointments, as well as advertizing future events via SMS or registering absences, and setting course-work deadlines.

Collaborative editing tools allow users to collaborate on a document, edit and create in groups. Examples of these tools include *Google Docs & Spreadsheets*. Most of these tools are still text only and do require a voice tool for full collaboration. Educational uses would include collaborative work over the Web either via simultaneous editing or shared work. One of the most peculiar advantages of this tool is the document sharing tool as it allows the editing of the same document by more than one user, as well as the resource to direct publication in a blog. In the E-learning 2.0 courses this tool could be used for the students to work in a collaborative way, allowing or restricting the access of the edited documents by the remaining members of the group. In online tutorial activities, GoogleDocs can efficiently serve as the individualized support of the teacher/instructor, sufficing that the document is edited just by the trainee and its tutor.

Google Pages also belongs to the Google family of tools and allows the creation of online pages without demanding major computer knowledge. The system is like a text editor and, therefore, in a quick and simple way, the trainees can build sites that can work as digital portfolios of the developed materials during an e-Learning course. The use of this tool by the teacher/instructor can be an excellent alternative to the creation of course or group pages as an alternative to the traditional LMS platforms.

Syndication and *notification* technologies provide tools to keep users up-to-date on recent changes to shared content. A feed reader can be used to centralize all of the recent changes and works with a Real Simple Syndication (RSS) tool to list changes. The RSS tool essentially provides a feed of data to the user. In education, these tools can be used to keep all members of a group informed. This may be particularly useful when employing a blog or wiki in the classroom as users would be made aware of up-to-date information (Simão, 2006).

These are just some of the new generation tools that can be used successfully in the e-Learning 2.0 environment. However, the technological evolution does not stop, constantly developing new and more versatile and interactive tools. The great challenge for teachers and instructors is to know how to use these tools in a way that learning environments can become even more personalized and adapted to each student's needs. The challenge will be to ensure environments are capable of integrating tools and services that can be managed by, and be the responsibility of, the user/student, that is, Personal Learning Environments, which will be address next

PERSONAL LEARNING ENVIRONMENTS

In 2007, Graham Attwell published in the electronic magazine *eLearning Papers* (www.

elearningpapers.eu), the article entitled *Personal Learning Environments: the future of e-Learning*, where he emphasized the questions that have been analyzed in this paper. The notion of Personal Learning Environment (PLE), as conceptualized by Attwell (2007), refers to a set of different applications, services and various other types of learning resources, gathered from different contexts.

APLE is a kind of e-portfolio extension, which shows the abilities and accomplishments of the student and it is from there that the student presents their professional qualifications. It is constructed by an individual and used in everyday life, for learning. It is not an application or a system but a personal assemblage supporting new learning modalities, induced by ubiquitous technologies and social software. According to Henri, Charlier and Limpens (2008), from the technological point of view, ubiquitous computing allows learning to take place almost everywhere, through wireless and GSM (Global Systems for Mobile Communications) networks and mobile communication devices that are able to access the Internet. The authors consider that new forms of learning can emerge from the use of the PLE.

Because the same technologies are used in the different context of our life, work, home, school, it could be possible to mobilize what has just been learned and apply it in the context it could be used (transfer of knowledge). Additionally, social software, predominant in PLE, represents technological development that allows people to connect and collaborate, and to create and share (Henri et al., 2008, p. 3767).

There is a strong idea underlying the PLE concept: autonomy of the learner and what Bandura (2003) calls self-directed learning. A PLE is not something that is imposed on an individual but something that one builds autonomously to suit a person's own needs and the type of learning they want to pursue. Self-direction is recognized by the

capacity to choose learning resources or learning providers—the time, place and context of learning. It is also manifested through the ability to grasp opportunities to learn that could be supported by PLE (Henri et al., 2008).

According to Kurznel (2004) and Henri et al. (2008), PLEs can seamlessly bring together various types of learning; learning by personal interest or the desire to solve a problem, community learning, school learning, experiential learning, workplace learning, etc. In short, it can embrace all formal and informal learning. PLEs have potential for more meaningful learning by facilitating reinvestment of knowledge in different contexts:

There is a major issue in that everyday informal learning is disconnected from the formal learning which takes place in our educational institutions (...). Personal Learning Environments have the potential to bring together these different worlds and inter-relate learning from life with learning from school and college (Attwell, 2007, p. 4).

Since lifelong learning is recognized as being crucial to our knowledge societies, it can easily be envisaged that everyone will develop their own PLE. In this context, PLEs should be considered as permanent, adaptable and evolving, enabling different types of learning, in different contexts and at different times in life.

The new generation of students who share the culture of Web 2.0 use, in their daily lives, blogs, wikis, RSS flux, podcasts and social software. Building their own PLE, thanks to ubiquitous technologies and social software, becomes natural. By doing so, they gain control of their learning and adapt it according to individual needs and interests (Henri et al., 2008). They therefore become part of a community for which they can create new content or roles to drive innovation (Lave & Wenger, 1991).

Institutions must then recognize their loss of control over content production, modes of trans-

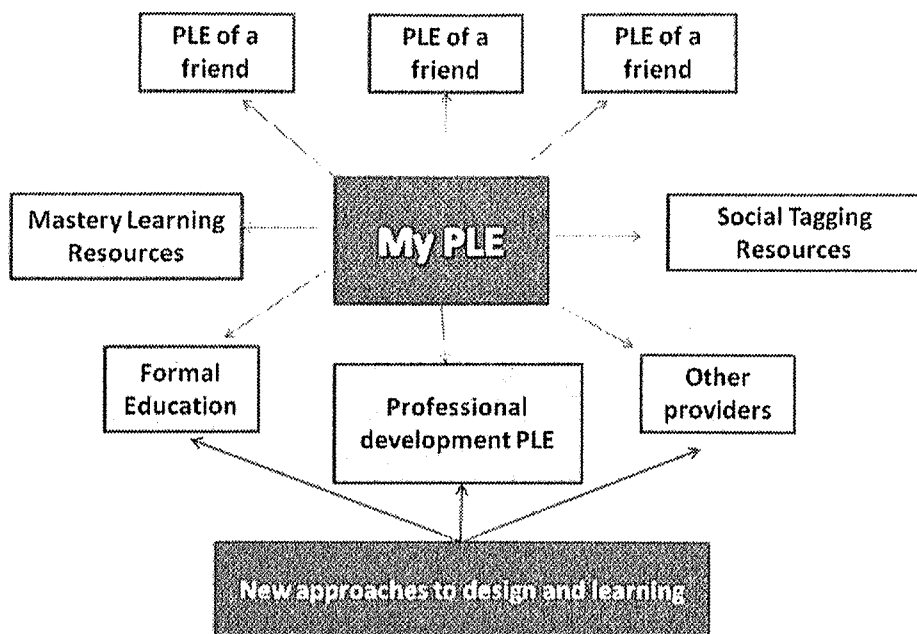
mission, learning process and validation. They have to accept the fact that ownership of learning is moving over to students. Educational systems should not ignore this phenomenon but rather try to find ways to valorize learning that takes place outside the institution and recognize its contribution to personal and professional development. This means that educational institutions have to develop a better knowledge and understanding of this new situation and learn how to exploit it in a constructive manner, for instance, being concerned in finding innovative ways to encourage the efficient use of PLEs, easing the blending of learning from PLEs and other educational resources (see Figure 2).

So, what will be the future role of the e-Learning institutions in this new context of learning? Will they cease to produce contents and offer courses online? The answer to these questions is still unknown, but we can foresee new ways to manage the production of contents for e-Learning. In fact, content will no longer succeed through the creation of courses, in the true meaning of the term, but through micro-contents, which are spread throughout the Internet. Blogs are one such micro-content demonstrated here:

The fact that a blog consists of individual postings is the start of MicroContent. These blog postings can not only be published on Web-pages, but also in syndication formats such as the RSS and Atom. By publishing postings in these formats a user syndicates his/her content, so that others may re-use it (Leene, 2006, p. 31).

Once aggregated, this type of micro-content allows the user to group and organize information within its PLE in a meaningful way. The teacher/instructor or learning designer thus has tools that surpass, in terms of the creation of knowledge, any platform of e-Learning that may have recently existed. In this context, e-Learning ceases to be only a medium, but starts to be the platform for learning:

Figure 2. Resources dynamics in a PLE (adapted from Henri et al, 2008, p. 3770)



What happens when online learning ceases to be like a medium, and becomes more like a platform? What happens when online learning software ceases to be a type of content-consumption tool, where learning is “delivered,” and becomes more like a content-authoring tool where learning is created? The model of e-Learning seen as a type of content, produced by publishers, organized and structured into courses, and consumed by students, is turned on its head. So far as there is content, it is used rather than read – and is, in any case, more likely to be produced by students than courseware authors. And while there is a structure, it is more likely to resemble a language or a conversation rather than a book or a manual (Downes, 2005).

However, the very fact that students/trainees create the content of the course, could question its validity. Folksonomies may be the solution, in terms of evaluating these resources. Yet here, the role of the teachers/instructors could gain new dimensions for effective study. Regarding the aggregation of micro-contents, the new trends

also point in the direction of the development of technological tools that allow the student/trainee to create knowledge, developing new and influential concepts of learning, such as Adaptive Learning:

Adaptive learning is important because it enables learners to select their modular components to customize their learner-centric learning environments. Secondly, it enables them to offer flexible solutions that dynamically adapt content to fit individual real-time learning needs (Martinez, 2004, online).

Having the student/trainee develop their own course content is a new way of perceiving learning paths. What advantages will this new concept of learning bring to the student? The availability of several learning stages in a course brings qualitative advantages. In the future, with the development of the technologies that support them, these paths will be built by the student/trainee (Martinez, 2007). This raises the importance of the new role of the teacher/instructor in this construction of knowledge.

AND THE FUTURE? IS IT WEB 3.0 OR E-LEARNING 3.0?

The first era of the Web is over; online spaces are becoming increasingly interactive; in the past, radio, video and multimedia enthusiasts had perceived these developments as an endless set of opportunities, bringing improvements in social relations, effectiveness of participation, and in decisions about the future of people. Web 2.0 tools not only promote sharing and collaborating, they define it. These tools have personalized users' experience and have dramatically changed the ways we communicate. We have become part of a community for which we can create new content or roles, and drive innovation (Lave & Wenger, 1991). In educational, cultural and linguistic spheres, these spaces can be used, most fully, to promote creativity and new ways to see beyond Web 2.0 technologies to the future – to the new emerging Web that is already upon us (Lansiquot & Rosalia, 2008).

The pending Semantic Web continues to develop, establishing the Web as tomorrow's intelligence (Berners-Lee, 2001). Will this be Web 3.0? One of the limits of Web 2.0 environments is the lack of contextual information; there is a lot of information but no one can organize and structure it in a meaningful manner. Therefore, the Semantic Web technologies aim at providing contextual information and co-ordination through workflow tools as supporting infrastructure.

To invest in the Semantic Web means welcoming the accomplishments of more complex research, impracticable with the search engines known today. The purpose of this intelligent, new generation Web is to classify information in categories in a standardized way so that it is easy to access required information; discussion is already taking place on search systems that are operated through the human voice or even through the search for similar pictures, by means of digitalization (Teten, 2007).

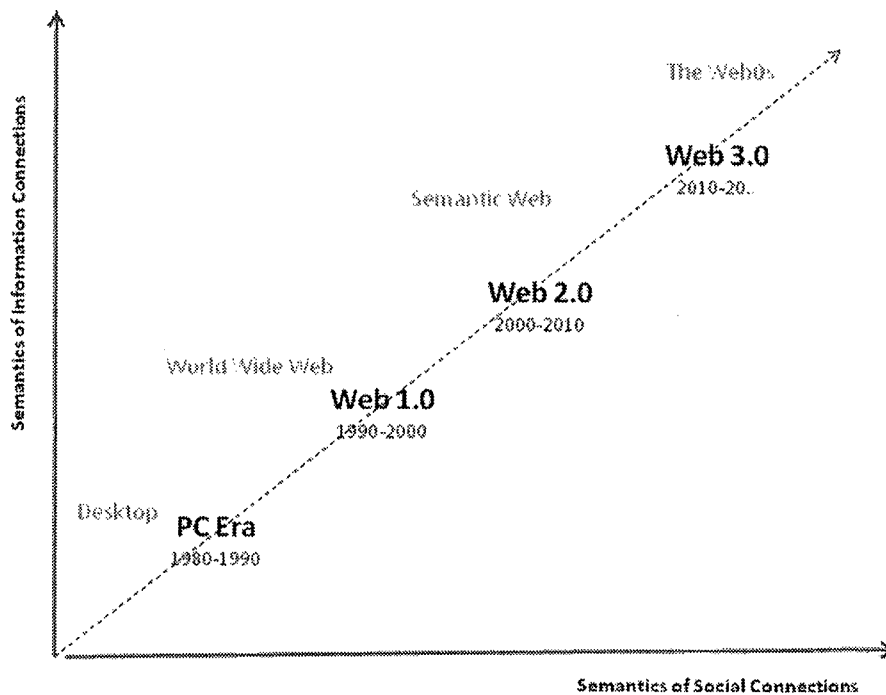
According to Lassila & Hendler (2007), the term Web 3.0 was used for the first time by John

Markof in 2006, in an article in the *New York Times*. Here, the author associated the term with the concept of a Semantic Web, although he considered that the latter was just one of the many technologies that would be used in the future, along with a much wider set of other tools and services, capable of turning the Web even more intelligent and effective. However, the association of the future Web generation to the Semantic Web is a recurrent subject in the perspective of many authors who recently approached these questions (Lansiquot & Rosalia, 2008; Balog-Crisan et al., 2008; Peter, Dastbaz & Bacon, 2008; Huyng-Kim-Bang, Dané & Grandbastien, 2008). In 2007, Tim Berners-Lee, author of the term Web 2.0, in an interview with Peter Moon for the site COMPUTERWORLD, when questioned about the future of the Web, he answered that the “future will be the semantic Web that will arise in the moment that the users of the network start to place links of public data or their personal files in the network”. This means that the databases, restricted today, will be even more open in a Web 3.0 scenario, allowing for total access to the data as well as the creation of combinations (mashups) of different information gathered in a large number of databases.

The Semantic Web will change the Web as we know it today. It will also deeply affect the e-Learning environment. The online world of the near future promises to fundamentally alter our perception of the Internet from a static communication channel into a thriving, virtual, global community. To understand where the Web is heading, we can take a look at its past, and at the intentions of its creators.

Entrepreneurs such as Nova Spivack and the co-founder of Microsoft, Paul Allen, developed a time line that traces and foresees the appearance of Web 3.0 in the year 2010 (see Figure 3). As one can see, the line shows how the evolution in the services and programs of the network went through the appearance of operational systems such as Windows, by the development of languages for the Internet, through the appearance of the generation

Figure 3. Evolution of the Web services (adapted from Radar Networks & Nova Spivack, 2007)



2.0 services (blogs, wikis, podcasts) and ended with a forecast of what would be the intelligent Internet, that is, generation Web 3.0.

According to Reneta Lansiquot and Christine Rosalia (2008), as the latest version of the Web continues to mature, an assortment of ideas for Web 3.0 has begun to take shape. Educators must think about how they will interact with the possibilities of a semantic, media-centric, and pervasive Web. In the semantic Web, for instance, machines will be able to read sites almost as easily as humans, enabling users to go beyond what they do now.

The media-centric Web goes beyond searching on just keywords, allowing, for instance, an art student to use a favorite painting to find a similar painting via search engines—finding media using other media. As for the pervasive Web, designers imagine the Web incorporated not only on handhelds and mobile phones but also on transparent surfaces, such as classroom windows: your closed window could have its corner pane reporting the

news from around the globe! The World Wide Web will soon morph into a World Wide Simulation: an immersive, 3-D visual environment that combines elements of virtual worlds (Lansiquot & Rosalia, 2008, p. 2662).

CONCLUDING REMARKS

The model of current training requires constant training throughout a person's professional life. Companies and institutions must keep their employees updated because innovations can quickly become obsolete in the ever changing learning society (Smith, 2000). Traditional training is not always appropriate, since employees (students) often have inflexibility time constraints therefore it is necessary to provide access to knowledge when and where it is most convenient: flexible training systems are needed, alongside custom-built programs, where students can personalize their own learning process. E-learning is the tool that

will allow this to be accomplished as a life-long training process.

The first Internet generation, which some call Web 1.0 had a huge amount of accessible information, which could be accessed by all. However, the role of the user, in these scenarios was that of a simple spectator; users did not having permission to alter its content. This first phase did not allow applications or services to be made available throughout the network unless they were purchased, and they were only accessible to a restricted number of users.

With the development of the new generation, Web 2.0, comes a new and varied range of online applications serving different purposes (blogs, wikis, podcast, online page editors, collaborative tools, etc.) To use these free resources and to actively participate in them does not require the user to have substantial knowledge of programming or the need for sophisticated computer environments. According to this new philosophy, users also become producers of the information, distributing and sharing their knowledge and ideas through the Internet, in an easier and faster way.

In this context it is possible to think of new scenarios for e-Learning, scenarios that replace traditional platforms to support teaching and learning (LMS) in more personalized, virtual environments, where, in formal education, students use the same tools that they use every day, to communicate in informal environments (Kurznel, 2004). E-Learning 2.0 allows the creation of learning environments adapted to the style of each student; it allows the teacher/tutor to have at their disposal a range of free tools for communicating and learning. By building their own PLE, thanks to ubiquitous technologies and social software, students gain control of their learning. Institutions must then recognize their loss of control over knowledge content, ways of transmission, learning process and validation. They have to accept the fact that ownership of learning is moving towards the students. Educational systems should not ignore this phenomenon but rather, try to find

ways to appreciate the learning that takes place outside the institution and recognize its contribution to personal and professional development. This means that educational institutions have to develop a better knowledge and understanding of the new situation and learn how to exploit it in a constructive manner.

E-learning 2.0 has to be understood as a tool that allows students to address the changes in the dynamic environment around them. It must be seen as the key success factor for any institution or business that wants to meet the demands of the globalization challenge. E-Learning 2.0 is at the center of lifelong learning.

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KEY TERMS AND DEFINITIONS

Web 1.0: The first generations of Internet where the users are all consider readers, they cannot interact with the content of the page (no comments, no responses, no quotes, etc). Being entirely limited to what the Webmaster rises to the website.

Web 2.0: The term Web 2.0 was first coined by Tim O'Reilly in 2004 to refer to a second generation in the history of Web-based communities of users and a range of special services such as social networks, blogs, wikis, podcast that encourage collaboration and exchange of information between users.

Web 3.0: Web 3.0 is used to describe the evolution of the use and interaction in the network through different paths. This includes the transformation of the network in a database, a move towards making content accessible by multiple non-browser applications, the thrust of artificial intelligence technologies, the semantic web, the Geospatial Web, or Web 3D

B-learning: According Al-Huwail, Al-Sharhan, and Al-Hunaiyyan, B-learning or Blended learning, merges aspects of e-learning such as: web-based instruction, streaming video, audio, synchronous and asynchronous communication, etc; with traditional “face-to-face” learning. The benefits of blended e-learning is that it allows students from different cultures the ability to select the delivery format of their learning content, hence improving their interaction with the environment.

Semantic Web: It's a concept proposed by Tim Berners-Lee inventor of World Wide Web. States that the web can be made more useful by using methods such as content tags to enable computers to understand what they're displaying and to communicate effectively with each other. That, says Berners-Lee, will increase users' ability to find the information they seek.

Folksonomies: According Stock (2007) In order to index documents the producer's and

consumer's of information apply the method of folksonomy, which is a kind of collaborative free keyword indexing. There are no indexing rules, everyone can tag a document with his or her favorite words. (p.97)

Meshup: According Cho (2007) originally a term used in pop music by artists and disc jockeys

when two songs were remixed and played at the same time, Web experts have borrowed the term when two or more softwares tools are merged. The resulting new tool provides an enriched Web experience for end-Users. (p.19)