Next-Generation Educational Web

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Abstract

The paper proposes the characterization of a converging approach for adult learning in both corporate and institutional environments and briefly presents iCamp – **i**nnovative, **i**nclusive, **i**nteractive & **i**ntercultural learning **Camp**us – project as the first implementation of an actual Next Generation Educational Web, supported by the emergent Web 2.0 "paradigm" and the social software technology behind it. It is intended to show you how the key elements under this blurry umbrella-like concept of Web 2.0 permeate the educational domain, allowing us to develop innovative pedagogical models, designed to be the basis of higher education, or adult learning in the same terms. The paper shows the first stages of our research efforts in iCamp through an integrated pedagogical model for supporting both, the traditional Learning Management Systems (LMS) / Learning Object Respositories (LOR), and the Personal Educational Environments (PLE) that comprise blogging and wiki tools as well as social networking services.

Keywords

Web 2.0, education, eLearning, TEL, pedagogy, social software, collaboration, training, enterprise

1 Introduction

Since blog phenomenon exploded, many other emergent processes have been considered as an integral part of a new evolutionary stage of World Wide Web that has been labelled as Web 2.0. This working concept can be useful for developing a new theoretical framework to fit new pedagogical models within. Among the very different approaches and various efforts in that way, iCamp could be the first pedagogy-driven project for designing and developing an actual learning virtual environment from the Technology-Enhanced Learning (TEL) point of view.

2 Web 2.0, the blogging phenomenon and social software emergence

It does exists a multi-faceted phenomenon that is driving the evolution to "a whole new Web" (Hof, 2005) known as Web 2.0 or Next Generation Web, if you want to accept this analogy with the Next Generation Internet motto generally associated with the IPv6 deployment.

Within that phenomenon, we can identify a series of technologies and services that are been built through a growing number of user innovation processes. We are talking about a certain kind of user, the super user or digerati – kind of "digital literati" – capable of leading the way in the prosecution of a new technological frontier.

Blogs are just the tip of Next Generation Web "iceberg". Wiki phenomenon – responsible for the Read/Write Web dream renaissance – syndication standards and aggregation services, collaborative semantic tagging services (folksonomies) or social software 'narrow-sense' services like Orkut, Linked or eConozco are all of them an integral part of the same process.

In a 'wide-sense', we could refer all that technologies as Social Software (Boyd, 2003). It can be considered as a supporting layer for the growing amount of services that are emerging just right now paving the Web 2.0 way.

The blogosphere itself could be understood as a "communication sub-space", where the conversational nature of human transactions is amplified by the network effects that emerge in

the “World Live Web” that is being built from the current World Wide Web. The key points of the blog phenomenon are far beyond the weblog as a web-publishing format with its characteristic updating frequency, hypertext density or its inverse chronological order.

This is a process of socialization: the Web (its content and its dynamics) is acquiring “human” significance. It’s not about being online anymore but living online; it’s about the things we – the users – do when we’re connected. We can create, edit, publish, share... content (every kind of content) by collaborating through the Internet in a social manner i.e. giving our actions a social significance. Just to mention the most well-known services, you have different blogging services like Blogger, TypePad or WordPress; we can share our photos in flickr, defining our different social circles (friends, family, colleagues); we can define, manage and extend our social (personal or even professional) networking (contact networks) with Linked, eConozco or Orkut

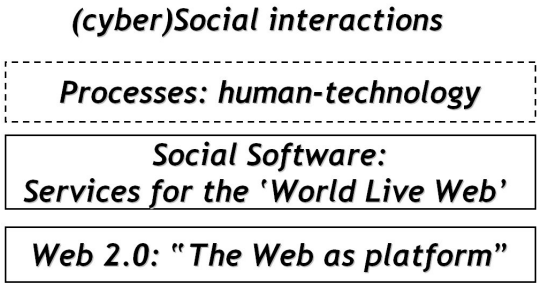

Figure 1Web 2.0 layered scheme (I)

services; we may also collaborate on line with project management tools like BaseCamp or wiki services like SocialText or eApuntes; if you want to, you can publish your videos or audio clips in OurMedia, or broadcast your podcasts through Odeo; You can access to encyclopedia-like articles with an outstanding update frequency in Wikipedia... the list grows to the infinite.

It's time for the real productive consumers – beyond the DIYers-like prosumers of the third wave announced by Alvin Toeffler – to lead the way. Anybody can contribute to a global categorization effort, the collaborative semantic tagging process that is taking place all over the world through folksonomies services like Blogmarks, del.icio.us, de.lirio.us or Wists. The kind of project not viable for any centralized computing resources you could ever imagine before.

We can try to visualize the Web 2.0 conceptualization in a layered scheme (Figure 1), where the Web itself appears as the technology platform supporting a growing and emergent amount of new applications and services we can consider as belonging to a single and wide sense social software concept. Upon this social software layer, we can realize the existence of a processes layer where takes place the emergence of new human-technology interactions in the form of new habits, routines and information “prosumtion” patterns. Finally, we find the social networks and the usual interactions the people build, but with a key point that is they are building that networks we can observe within a new (cyber)social environment that resemble some kind of “real virtuallity”, bridging the current gap people usually see between their lives in the real world and their different “avatars” within the Internet.

If we open up each of these layers (Figure 2) we're talking about, we'll find a growing amount of different components; a series of elements, each of them with its own domain, but contributing - as a whole - to the new “platform” that is been built upon the New Generation Internet. In the technology layer, we can identify microformats like xhtml or FOAF that could be generalized as semantic web technologies (with small letters, to be different from Semantic Web efforts from W3C) or Web Services acronyms (UDDI, WSDL, XML, SOAP, XSLT... are the more common among them), SOA as THE architectural paradigm, AJAX as a new technology combo aiming the developing of a new generation of rich user interfaces...

The majority of them appear in the detailed figure below, but you can miss some acronyms. Don't worry about it; it's the same with the upper layers: in the social software one, you have

blogs (all kinds of weblogs), wikis, folksonomies... and the you can encounter processes like blogging, tagging, sharing... and the corresponding actions in the social layer but, at the end of the day, the key driver to have such a kind of layered architecture "up and running" must be innovation, USER INNOVATION, and its representation at every level in the scheme. That is the actual engine of this conceptualization, the only one that can support the conversational dynamic and emergent nature of this Next Generation Web.

3 Education, pedagogy and learning theories

The history of the pedagogical models behind the traditional learning systems and tools has been built upon a series of well-known theories that have to put up with the new challenges the network society is realizing. Briefly reviewing these theories, in chronological order, we can

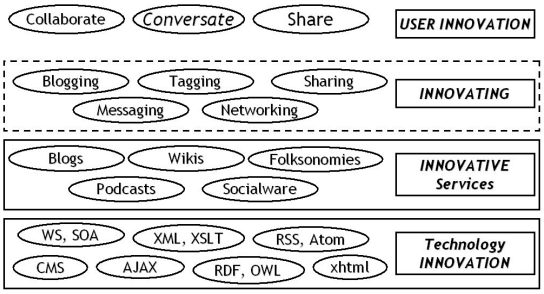

Figure 2Web 2.0 layered scheme (II)

establish some kind of evolutionary path to end up with the "E-learning 2.0" (Downes, 2005) that could be considered as the iCamp conceptual framework.

Behaviorism is related with a passive learner and a traditional transfer mode for teaching in a one-way unidirectional (verbal) communication. This model is based on the "know-what" paradigm.

Cognitivism is related with an active learner and a not so traditional tutor mode for teaching in a bi-directional (mostly verbal and unbalanced) communication. This model is based on the "know-how" paradigm.

Constructivism is related with a so-called creative learner and a hardly seen coaching mode for teaching in a two-way bi-directional (mostly visual and almost balanced) communication. This model is based on the "knowing-in-action" ("learning-by-doing") paradigm. The formalization of constructivist learning theory is attributed to Jean Piaget, who suggested, "Through processes of accommodation and assimilation, individuals construct new knowledge from their experiences".

Social Constructivism is a way of extending the constructivist approach and its "interpretivism" epistemological background with some kind of internally driven social interaction. Social constructivists view learning as a social process. Reality cannot be discovered: it does not exist prior to its social invention; knowledge is also a human product, and is socially and culturally constructed. Meaning is created through the individual's interactions with each other and with their environment. They accept the existence of some kind of "inter subjectivity", as a shared understanding among individuals.

Connectivism (Siemens, 2005) is intended to unify chaos, networks theory and complexity yielding a new theoretical framework for explaining not only individual but also social and organizational learning processes too. This approach goes beyond the constructivism itself and even the latest "versions" of social constructivism including social interactions without avoiding the same inside-out limitations of the original theory.

The starting point for this concept is that the knowledge exists by itself. Individuals mustn't build it. They are supposed to realize that knowledge by connecting the nodes where it's located; being

that nodes other individuals, organizations, different clusters weakly tied... “It is changing the Know-How and Know-What for Know-Where the Knowledge is” (Siemens, 2005).

Some of the connectivism key principles are expressed as follows by its author.

- Learning is a network forming process
- Capacity to know more is more critical than what is known
- Learning rests in aggregating diverse, often opposing, views.
- Content is often the by-product of the learning process, not the starting point.
- Connections, not content, are the beginning point of the learning process.
- Learning can reside in non-human appliances.
- Knowledge can rest within our network, not only internally in ourselves.
- Ability to see connections (pattern recognition) between ideas and concepts critical to learning.
- Currency (up to date knowledge) is the intent of properly created learning networks.
- Decision-making is in itself a learning process.

When we talk about Next Generation, we are not talking only about Next Generation Internet, but also about Network Generation as a reference to the Millennial Generation that was grown up with the Internet as an integral part of their lives. The connection between these two facets of the same emergence process is the eLearning 2.0 metaphor described in (Downes, 2005) based on some principles and paradigm shift heritage from Connectivism and Web 2.0 emergence:

- Learner-cantered design
- Network Generation students
- Teachers and Learners (Students) as peers within social networking environment
- Social Software as services built upon a Web platform
- “From a web of documents to a web of data” with the emergence of “microcontent”.
- “From a Web as Media to a Web as platform”
- “From Communities of Practice to Social-Networking”
- From traditional learning applications and systems managing learning objects within a pre-defined learning architecture to an open learning environment composed of interoperable loosely coupled open-source platforms and tools aimed to support the social interactions of peers on the N-Gen EduWeb, the Educational Web 2.0.

It's not about matching traditional models with existing tools (Baumgartner, 2005) anymore; It's about developing a brand-new pedagogical model and implementing the Next generation Web environment upon it.

4 A converging approach for adult learning

The new, emergent techno-social environment is pushing the enterprise training and institutional education to meet together via the paradigm shift from educational to learning approach, and its impact in developing innovative TEL systems. This approach operates changing the terms we use for conceptualize the learning processes, and applies almost the same way both, in the corporate landscape and in the social environment of institutional higher education. That conceptualization could be used for dissecting the social component of Next Generation Web emergence as follows.

Next Generation Web is gathering a growing amount of such-called ‘social software’ tools aiming at the “socialization” of the Web. We understand “socialization” in this context as the

process of making available online some social networking and content management services supporting processes like personal and group relationship management or content online editing, publishing and sharing.

Hence, we have focused on tackling two sides of the same equation, social networking as the core 'blended' process, supported by social software and enabling the application of social instruction and peer-supported scaffolding models on behalf of the social constructivist approaches. There is a series of concepts for defining the context of our approach in order to identify the challenges (i.e. opportunities) Eduweb 2.0 (Fumero, 2005) offers for proposing innovative and creative ideas within a new learning environment.

In considering such an environment, we can split first the scenario in two different facets, the technological facet, and the sociological one. Such a conceptual split could be useful for managing the complexity of such an scenario. If we look at the layered vision of a Web 2.0 architecture (Figure 1) it's possible to think about bridging the "processes" gap between social software technology layer and cyber-social interactions with the social networking as the blended (off- and online) process driving the "social tagging", collaborative filtering, sharing, publishing... at a 'human' level.

The main challenge we're putting up with is a sociological one. The entrance of digital natives (as they are represented by network generation, or Millennials) not only in our higher education institutions (HEIs) but in the enterprise is changing the way corporations run their businesses. One of the characteristics of this new generation that many studies highlight confronting them with Gen-Xers is that "Millennials are unbelievably gifted at building, maintaining, and tapping into networks" (Knowledge@Emory, 2006).

According to Wikipedia, a social network –a term coined by J.A. Barnes in 1954— is *a social structure between actors, mostly individuals or organizations. It indicates the ways in which they are connected through various social familiarities ranging from casual acquaintance to close familial bonds.* The same source estates that *social networking also refers to a category of Internet applications* –usually known as online social networks— *to help connect friends, business partners, or other individuals together using a variety of tools.*.

Social network analysis, SNA (a.k.a. network theory) *has emerged as a key technique in modern social sciences and organizational studies, as well as a popular topic of speculation and study. Social networks operate on many levels, from families up to the level of nations,* or even the enterprise (Cross, 2005) *and play a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals.*

A social network service can be defined *as social software specifically focused on the building and verifying of social networks for whatever purpose. Many social networking services are also blog hosting services.*

According to (Boyde, 2003) the "phrase" social software can distinguish software built around one or more of these premises:

- Support for conversational interaction between individuals or groups — including real time and "slow time" conversation, like instant messaging and collaborative teamwork spaces, respectively [...]
- Support for social feedback — which allows a group to rate the contributions of others, perhaps implicitly, leading to the creation of digital reputation [...]
- Support for social networks — to explicitly create and manage a digital expression of people's personal relationships, and to help them build new relationships [...]

Social networks enable individual's access to Social Capital (Lin, N 2002). Social capital consists of resources embedded in one's network or associations, so they can be reached through individual's social network. The Social Capital theory applies to hierarchy social structures, like

wealth, power and reputation. It could be also considering in knowledge, as it may also form a hierarchical structure.

All these propositions encourage the building of "learning networks" between individuals. These networks may take different aspects and proprieties. Learning networks involve social, informational and technological ones. A more specific approach must consider that learning networks as containing the social (organizational-, personal- and community-related), informational (content-related) and technological dimensions of the individual performance in the different environments.

There is some common understanding of the necessity for dealing with organizational complexity in terms of social networks, even in the corporate environment (Cross, 2005). "Different work models, building community across employees and new methods to compensate staff (e.g., skill/competency development, talent management programs) are leading indicators that people are being viewed as a more critical business asset than before." (Gotta, 2006). The traditional organizational theories are being substituted by the modern network theory approaches switching from pyramidal and matrix models to cellular and networked dynamic structures ruled by emergence and synchronization trends like show the results from (The Economist, 2006). There are research studies whose results recommend the combination of network analysis and cultural assessment for change management (Cross, 2006).

The interest of the corporations for integrating social software tools represents an opportunity for the software industry and we can find evidences of the industry betting on this "social" reality o Next Generation Web. Tech giants like Microsoft Corp. –proposing an architecture strategy aimed to "bring the user back to SOA" through the implementation of a kind of REST approach— or even IBM, that seems to be transforming itself into some kind of "*International Blogging Machine*" leveraging the systems they've been using internally for almost a decade as we can see in (Farrel, 2006).

We must take into consideration that all these elements we've just briefly listed here apply not only in educational institutions and their relation with society, but in the organizational landscape shaped by Live-Long Learning (LLL) and the personalization of employee skills portfolio as a way that makes it possible to be interoperable with standards adopted by modern educational institutions. The other way around, we must consider the implications of Self-Directed Learning (SDL); we are shifting from educating to learning, and from institution-driven to learner-driven environment.

5 Paving the way[1]

The project – iCamp – starts in October 2005, with the participation of ten associated centres from nine different countries as consortium partners: Jozef Stefan Institute (Slovenia), Tomas Bata University (Czech Republic), Universidad Politécnica de Madrid (Spain), University of Leicester (United Kingdom), Tallinn University (Estonia), Centre for Social Innovation (Austria), Vienna University of Economics (Austria), University of Science and Technology (Poland), Kaunas University of Technology (Lithuania), Isik University (Turkey).

The main objectives of iCamp is to create an open virtual learning environment for university students across Europe by connecting different open source learning systems and tools, and provide interoperability amongst them. This new learning environment is a learner-centred space where students and educators will work collaboratively on assignments across disciplines and across countries.

[1] The project information presented here is available in the project portal [http://www.icamp-project.org].

The objectives in iCamp are driven by pedagogical, technical and social challenges and can be summarized as:

- *Investigate, develop and validate innovative pedagogical models for social instruction that support learners in achieving their learning goals in a self-directed manner and to establish social networks*
- *Provide a validated portfolio of constructivist learning tools that support these innovative learning models*
- *Provide an open virtual learning environment consisting of a network of learning tools, platforms and repositories*
- *Develop and describe open source code for connecting to the iCamp network and to provide interoperability amongst different systems.*
- *Document and describe best practices to be derived from the validation trials for universities that may benefit from iCamp in the future.*
- *Assess the actual and potential impacts of the iCamp network on Higher Education Institutions at different levels and from different perspectives*

Even in the early stages of our research efforts, it's worth mentioning some useful findings for future development tasks and even for different project proposals:

- We have to take into consideration the growing gap that exists between the institutional platform-like environment, traditionally associated with the "corporate" LMS and the instructional design world, and the emerging reality of the Personal Learning Environments (PLE) that comprise a lot of social software tools the people use for organizing their work and relationships in the "online world". Figure 3 represents the different usage patterns and interoperability levels causing the gap, expressed in terms of some components and services normally associated with each one of both worlds.
- There are a lot of efforts for bridging that gap. It could be useful to identify the different "settings" we can find in between both, the institutional and the personal world. The degree of intervention we can achieve in this kind of projects will be different in each of that settings or scenarios.
- It's useful to preserve, to some degree, the diversity of the learning/educational tools ecosystem. We will need both, institutional scalable and extensible learning platforms, and innovative flexible "hackable" personal learning tools that individual users can play with outside – or even when they are engaged with – any Educational Institution. In such an ecosystem, standardization will be a key driver for interoperability.
- The social component of Next Generation Web native services is the key element and driving force in bridging, not only the personal – institutional gap, but even the corporate – institutional one, enabling the building of new conceptual approaches and architectures both, for enterprise and educational system enabling them for finding a half-way meeting point supported by a new techno-social environment.

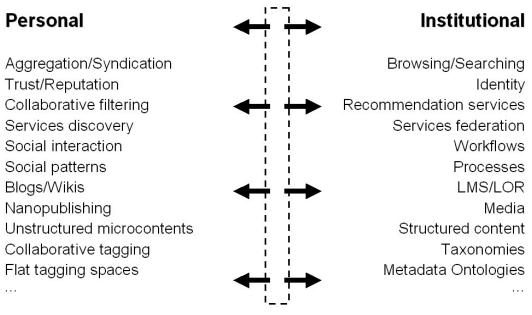

Figure 3The gap between Institutional and Personal Learning Environments

6 Conclusion

Let's highlight the key points behind the emergence Next Generation Educational Web as concluding remarks:

- Many things have changed in this first decade of Web history, and we are entering a different evolutionary stage where the Web is becoming an actual "social environment". Hence, this transformation impacts every industry, or social segment with no exceptions.
- We have new theoretical frameworks – far beyond the traditional educational theories and their philosophical background – for dealing with that change, allowing us to integrate the innovative social patterns that are emerging within our models.
- Institutional and corporate educational environments are converging into a learning-driven framework based on SDL and LLL requirements in a networked society.

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