EDUWEB 2.0
iCamp & N-Gen Educational Web

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Keywords: Web 2.0, Internet, eLearning, TEL, Education.

Abstract: This article presents iCamp – innovative, inclusive, interactive & intercultural learning Campus – as the first implementation of an actual Next Generation Educational Web, supported by the emergent Web 2.0 paradigm and the technologies surrounding 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 a brand-new learning environment upon a series of innovative pedagogical models, designed to be the basis of Higher Education in an enlarged Europe.

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 labeled as Web 2.0. This working concept can be useful for developing a new theoretical framework to fit new pedagogical models within. Among the different approaches and various efforts in that direction, 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

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 – some kind of "digital literati" – capable of leading the way in the prosecution of new technological frontiers.

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, tagging services (folksonomies) or social networking services like Orkut, Linked or eConozco are all of them an integral part of the same process.

We could refer to all that technologies – in a 'wide-sense' – 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, in the sense that 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; hence, the socialization of the Web. Among the myriad of new services, we can find different
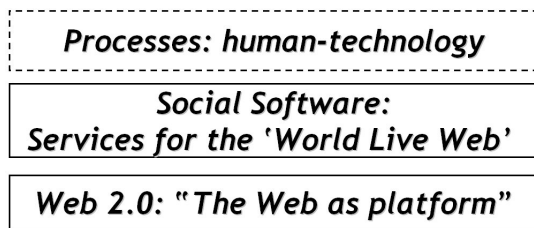
(cyber)Social interactions

Processes: human-technology

Social Software:
Services for the 'World Live Web'

Web 2.0: "The Web as platform"

Figure 1: Web 2.0 layered scheme (I).

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 services; we may also collaborate online 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. This kind of project is 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 (wide-sense) social software concept. Upon this social software layer, we can realize the existence of a processes layer where the emergence of new human-technology interactions takes place shaping new habits, routines and information "prosumtion" patterns. Finally, we find the social networks people are building 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 (Friend-Of-A-Friend) that could be generalized as semantic web technologies (with small letters, to be differentiated from Semantic Web efforts from W3C), Web Services acronyms (UDDI, WSDL, XML, SOAP, XSLT), SOA as THE architectural paradigm or 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, while 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 see 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 2.0

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. If we briefly review these theories, in chronological order, we'll be able to 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-
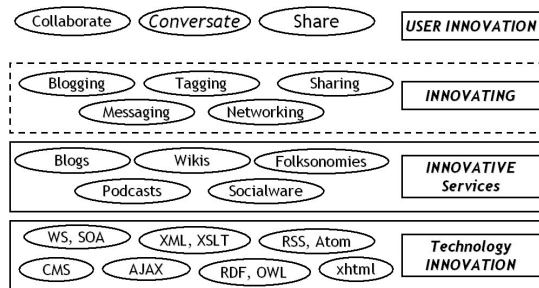
Figure 2: Web 2.0 layered scheme (II).

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. "Vygotsky favored a concept of learning as a social construct, which is mediated by language via social discourse" (McMahon, 1997). 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

4 ELEARNING 2.0

N-Gen stands not only for Next Generation, but also even for 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:

- Learner-centered design
- N-Gen 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". Hence the emergence of micro- and nano- learning.
- "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.

5   iCamp[1]

The project – iCamp – starts in October 2005, with the participation of ten associated centers from nine different countries as consortium partners:

- Jozef Stefan Institute (JSI), Slovenia.
- Tomas Bata University (TBU), Czech Republic.
- Universidad Politécnica de Madrid (UPM), Spain.
- University of Leicester (ULE), UK.
- Tallinn University (TLU), Estonia.
- Centre for Social Innovation (CSI), Austria.
- Vienna University of Economics (VUE), Austria.
- University of Science and Technology (AGH), Poland.
- Kaunas University of Technology (KTU), Lithuania.
- Isik University (ISIK), Turkey.

The project will be coordinated from Austrian CSI. Some of these partners belong to PROLEARN Excellence Network for eLearning development.

5.1   Project Objectives

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-centered space where students and educators will work collaboratively on assignments across disciplines and across countries.

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

5.1.1   Pedagogical Objectives

The pedagogical approach in iCamp starts from the constructivist learning theory, with a focus on an independent and self-organized learner. The iCamp project emphasizes social instruction through a **social networking model**, with educators playing the role of mediators and mentors. The new environment we envision – iCamp Space – will provide tools to facilitate the mentoring and mediating role of the educators in an open learning environment and peer mentoring amongst students to support social learning.

The iCamp model of **scaffolding self-organized learning** will support the learners in identifying their needs and to plan and carry out learning projects in non-formal and informal settings. Individual learning contracts (as an integral part of a **learning incentive model** supporting the motivation of students for self-directed learning) and learning diaries will be drafted and combined with an easy access to distributed and networked resources, and personal and collaborative web publishing tools and practices that are used for blog authoring.

The collaboration amongst students across countries also implies cultural differences in learning and these have to be respected and supported by the learning environment. Diversity and localization issues will be addressed in the design model. In this context, a further analysis of emerging personal and collaborative web publishing practices such as weblog authoring will provide insights into the codification and standardization of **cross-cultural and cross-disciplinary social networking** and

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[1] This information has been published in the iCamp Project website, (http://www.icamp-project.org).

information sharing in open, networked environments.

5.1.2 Technical Objectives

In terms of collaboration and communication iCamp will focus on the potential of new tools that support the creation of social networks amongst the students and other peers. These new tools shall support the personal preferences of the students.

iCamp will offer the students as well as any academic staff access to large content repositories that go beyond the currently existing learning object repositories. The challenge for iCamp is to further explore ways to retrieve important information from the deep web by extending the Simple Query Interface (SQI) and thus provide interoperability amongst the various systems.

iCamp will also develop strong interoperability amongst different open source learning platforms. Some of the known learning tools and repositories that have already been identified for potential integration and usage are **Educational Repositories** (EducaNext and PROLEARN network of educational nodes, Universal Brokerage Platform (UBP) based repositories, EMDEL, EUDORA portal, LIEDM (Lithuanian Distance Education Network), Slovenian catalogue of learning resources), **Learning and Content Management Systems** (Moodle, Drupal, Plone, DotLRN, IVA from Tallinn University), **Digital Libraries** (Central and Eastern European Online Library), **Videoconference Tools** (VIPS - Interactive Video Presentation and Lecturing System - ISABEL, FlashMeeting), **Synchronous & Asynchronous Communication Tools** (Instant Messaging, E-mail, VoIP), **Wikis** (TikiWiki, MediaWiki), **Authoring Tools** (CDK Course Development system from Kaunas University), Blogs (full CMS based as Plone or specific platform based like WordPress).

An iCamp Space will then be designed and a set of iCamp Building Blocks that most contribute to the iCamp pedagogical goals selected. The selected tools will be adapted for integration and support of the **functions and mechanisms that foster collaboration:**

- **Personalized search** functions for peer learners and learning resources that most contribute to the learning needs.
- **Mechanisms for decentralized sharing** of experiences and reflection on the learning process and resources with other peer learners.
- **Personal learner portfolios**.

5.1.3 Social Objectives

In order to assess the potential of iCamp in supporting and fostering the creation of social networks the project will apply a social network analysis approach. The research questions tackled are related to the theory of social capital, with experiments in the iCamp educational environments carried out to examine its explanatory power in a cross-cultural setting.

During the validation phase of iCamp the question of how an eLearning community evolves as a social network over time shall be addressed by analyzing certain influence factors: the size and shape of the network or its interaction patterns.

The cooperation and collaboration of students from different countries in an enlarged Europe also implies social challenges related to cross-cultural aspects and diversity. It is the objective of iCamp to provide a careful exploration and evaluation of the social interactions that emerge in this kind of virtual collaboration environments.

All these objectives must be translated into specific results via the definition of a series of project goals. These goals can be summarized as follows.

1. **iCamp Space**: an open virtual learning environment consisting of a network of learning tools, platforms and repositories
2. **iCamp Interoperability & Collaboration Patterns**: description and open source code for connecting to the iCamp Space
3. **iCamp Building Blocks**: a portfolio of constructivist learning tools
4. **iCamp Models**: validated models for scaffolding, social instruction, cross-cultural collaboration, and learning incentives
5. **iCamp Best Practice**: experiences gained and validated by trials in various universities across Europe will be documented in the iCamp evaluation reports
6. **iCamp Exploitation Model & Plan:** ensure sustainability beyond the project consortium by investigating and establishing Public Private Partnerships (PPP), active awareness building and trailing outside the consortium partners, elaborating Revenue Models, creating a supporting infrastructure, and integrating existing open-source and standardization initiatives

5.2 Contributions to Standards

Standards play a crucial role when it comes to the set up of semantic networks. For iCamp the following rather newly developed standards are relevant:

- **Learner profiles:** IEEE Personal And Private Information (PAPI), IMS Learner Information Package (LIP).

- **Learning Artifacts Metadata:** Learning Objects Metadata (LOM), Dublin Core, IMS Learning Design (LD).

- **Digital Rights Management:** Creative Commons (CC), Open Digital Rights Language (ODLR).

- **Seamless access:** Security Assertions Markup Language (SAML), eXtensible Access Control Markup Language (XACML).

The iCamp consortium has identified the following areas where standards are lacking and the project has the potential to significantly contribute to the evolution of such:

- **Standardized APIs for Querying and Metadata Replication:** SQI could be an effective solution for achieving interoperability between heterogeneous repositories. However, still a lot of work remains to be done in order to enhance the API with methods for collaboration, query process management or personalization. An extension of the API that supports metadata replication is also needed. The project will be in strong collaboration with standardizing bodies and other driving forces of the field such as the Network of Excellence in E-Learning and Semantic Web and aims at contributing to the further development.

- **International Standards for Collaborative Technology:** iCamp will contribute to the JTC1 ISO/ICE SC36/WG2 on interoperability of collaborative learning systems. This working group is a Joint Technical Committee between ISO and the International Electro technical Commission (IEC) and is engaged in the gradual evolution of learning systems from stand-alone systems to collaborative learning environments.

6 CONCLUSION

I would like to highlight – as a concluding remark – the key points that explain the emergence of a whole new breed of TEL projects like the one we've just presented here:

- Many things have changed in this first decade of Web history, and we are entering a different evolutionary stage where the Web is becoming – more than ever before – an actual "social environment". Hence, this transformation impacts every industry, economic sector or social segment without any exception.

- We have new theoretical frameworks – far beyond the traditional epistemological pragmatism as the philosophical basis for cognitive constructivism – for dealing with that change, allowing us to integrate technology itself and social issues within our models.

iCamp could be useful as a pioneering project and a case study for future efforts in developing such an ambitious learning space.

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