

Learning 2.0

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This article explains why Web 2.0 can be considered much more than a technological revolution. Since the irruption of the new digital tools, not only a new form of interaction was consolidated, but a way to strengthen collective knowledge-based learning. The incessant growth of Web 2.0, allows us to project a constant duplication -in briefer intervals- of the knowledge generation level in this new digital architecture. All those new social technological innovations will have direct impact in the consolidation of new models to teach, learn and share knowledge. That is why, new learning perspectives should explore and include the multiple online resources to keep updated and take advantage of the benefit of this changing digital era.

The accomplishment of this new educational paradigm demands the adoption of skills related with a creative, innovative and imaginative use of the information in order to make the most of the human intellectual capital. This article analyses how the configuration of a new knowledge-based educational paradigm can consider the current information technologies evolution and its impact, by empowering the student's experimental learning through the use of online collaborative tools in the context of Web 2.0.

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Collaborative World Wide Web

Unlike the traditional and rigid structure of the Internet, with few emitters and a lot of receivers, today we find a new architecture being adopted in which Web applications became particularly simple, making possible the interaction of many to many. Today there is an opportunity for a non-specialized user to have a set of tools much broader at hand. On the other hand, users, teachers and students, who have most advanced knowledge, can find numerous opportunities to intervene the procedure of online applications.

This new architecture takes part in a phenomenon labeled as *Web 2.0*, which is not just a new technology version, but a different way to understand the network technology,

giving special emphasis in the open interchange of knowledge.

What is Web 2.0? It refers to a supposed second *generation* of *Internet*-based *services*—such as *social networking sites*, *wikis*, communication tools, and *folksonomies*—that emphasize online collaboration and sharing among users. Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, creating network effects through an “*architecture of participation*” (O'Reilly, Oct. 2005 and *Wikipedia*, 2006).

The Internet isn't just a reading source anymore: it extends itself into a constructivist space of writing and participation's interchange. The outlined scenery offers a huge potentiality to support the consolidation of a new paradigm of education.

In the new philosophy, the main fundamentals are: constructivism, innovation, post-modern environment of knowledge generation, and the collaborative intellectual capital. Much of these characteristics were impelled by the free software developers, the open source culture and others peer-production users.

Web 2.0 empowers users and provides a platform to share and gather enrichable knowledge. The universe of e-applications, labeled as Web 2.0, grows and evolves proportionally with the amount of people and communities who are sharing Internet and its tools.

A good example of it, is the “folksonomy” concept (folk+taxonomy), which describes a new social approach to create metadata for digital resources. The “folksonomies” moved away from a hierarchical to a social approach by being based on the collective collaboration of people who cooperate through organizing information (by tags).

The folksonomy-generated data emerge from millions of users actions. This teamwork system used by many social networking applications, describes a concept that Pierre Lévy (2002) defined as *collective intelligence*: the capacity of human communities to co-operate intellectually through creation, innovation and invention. As we turn into knowledge based learning society, this collective collaboration becomes a matter of fundamental relevance.

Web 2.0 is centered in knowledge generation and not only in the use and sharing of information. This characteristic is convergent with new educational models that give to knowledge production: a fundamental priority during the learning process. An outstanding example of it is the “Leapfrog” education, developed by A. Harkins, J. Moravec and G. Kubik (2006), and others scholars from the University of Minnesota.

One of the most relevant characteristic of this new educational paradigm is to promote the transformation of information and learning experiences into personally usable, practical knowledge; and help the learner to present

results of this transformation to other as “new” information. This model requires students/teachers “digital alphabetized” as a requisite for a better use of information technologies that supports the ubiquity of communication, knowledge production and multi-paradigmatic thinking interchange, qualities that allow a globally-distributed education for the 21th century (Harkins and Moravec, 2006).

The techno-social revolution of Web 2.0 has been developed gradually during the last few years, but it is now when its impact and repercussions has being evidenced. In fact, today it is possible to think on the consolidation of the collective knowledge, as Surowiecki (2004) and Rheingold (2002) announce.

As a basic consequence, Web 2.0 evidences the following evolutionary steps of Internet. We can notice this transition of traditional desktop applications towards tools that work online without the need to be downloaded. It simplifies notably the human-web interaction, turning ubiquity of use and reciprocal interchange into key principles.

This growing phenomenon is especially interesting to be examined with more attention, to understand how Web is evolving and how this continuously regenerative cycle of performance and technological innovation empowers, what some authors have labeled as “learning by sharing” (Maes, Thijssen, Dirksen, Lam, and Truijens, 1999).

Examples of Web 2.0 technologies (intelligent ways to share knowledge) that can be use to generate and distribute knowledge in the educational context:

1) *Wikis*: open, writable web pages that offer the possibility for anyone to become a *collaborator*, by modifying, amplifying, or enriching the published hypertext multimedia content.

Its open qualities facilitate the creation, editing and hyperlinking of text files. This open architecture, allows *wikis* to facilitate the collective construction of information-

knowledge with a special focus in virtual communities and learning environments. One of the most successful cases of collaborative writing is *Wikipedia*.

Wikis can be used in lessons to define concepts cooperatively. For example, a teacher can propose to his students to define what they understand about “globalization”, and the group can construct collectively the definition of the word online.

2) *Repositories*: social, online, open spaces created under the philosophy of collaboration. They offer the possibility of uploading or downloading multimedia resources (text, image, voice or video) that can be useful for pedagogic or scientific purposes, especially in universities or research centers.

Repositories are generated to store free contents, which simplify in a notable way the exchange of knowledge among authors-professor-academics-students as a “distributed” research centre or laboratory (sharing scientific and academic documents, projects, reports, conferences, papers, data bases, and others). With this tool teachers can storage the “learning objects” used in their lessons and the students can have the possibility to consult the content as many times as they need and, also, to share specific resources that are used in classes. At the same time, it becomes an open academic library with pedagogical materials that can be used by other professors. Some examples are: *Connotea*, *Open Course Ware (MIT)*, *in.solit.us*, *Colaboratorios* or *PLoS ONE*.

The UNESCO World Report *Towards Knowledge Societies* (Bindé, 2005) describes the repositories (also known as “collaboratories”) as a new knowledge-sharing model that should be expanded in the future. Under these conditions, science and technology can contribute to build knowledge societies based on the inclusion and participation of as many people as possible. It allows the coordination between numerous teams dispersed.

3) *Blogs*: chronological web pages that become the most popular *Content Management System (CMS)* in the Web 2.0. New research by *Pew*

Internet & American Life project (Lenhart and Fox, 2006) finds that 147 million Americans use the Internet, and 57 million of them read at least one blog regularly.

Through the use of this tool, *bloggers* are contributing to the achievement of the dream of the visionaries of the Internet: to generate a vast universal repertoire of knowledge and information. “*When you write a blog, you don't write complicated hypertext, you just write text, so I'm very, very happy to see that now it's gone in the direction of becoming more of a creative medium,*” explains Sir Tim Berners-Lee who created the first website (Berners-Lee, 2005). Blogs have revolutionized the options to generate contents on the Internet, by impelling a new type of communities based on the knowledge, and contributing to the enormous task of equipping with sense and relevance the information available on the Web.

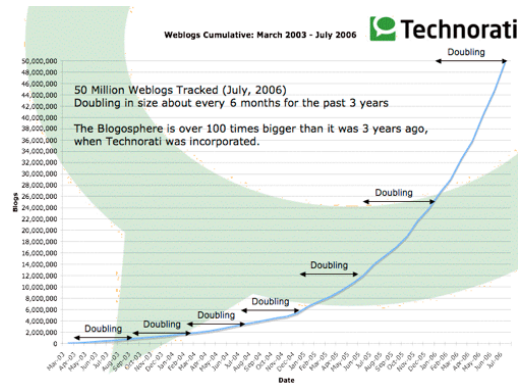


Figure 1. Doubling of blogosphere.

In August 2006, *Technorati* tracked 50 millions of *blogs* and the *blogosphere* continues to show significant growing: it has been doubling its size every 6 months and it's over 100 time bigger than it was 3 years ago (Sifry, 2006). In fact, more than 2 blogs are being created each second per day and there are about 1.6 million posting per day, or about 18.6 post per second.

The blogs can be used in lessons individually or by a group of students. These tools offer an online writing space with pedagogical resources that can be shared through the Internet. At the same time, the blogs make possible the registration of the content taught, organized through by a chronological taxonomy.

The described Web 2.0 applications offer to individual and to collectives (“learning communities”) the possibility to share and construct capital, information and explicit knowledge for many diverse learning contexts, through many different channels.

The map of new applications that can be inserted into the framework of Web 2.0 is diverse, and permanently renovated. Suggested sites to find long list of Web 2.0 services/links/applications/software are: [Zdnet](#), [Blinklist](#), [CNN](#), [Abanet](#), [Web2.0awards](#), [Buzzsabout](#), [Econsultant](#), [Wwwbatsnew](#), [Listible](#), [Web2.Oslides](#).

Evidences of the increasing online collaborative practices:

Some representative examples of collective collaborative practices¹, which evidence the tendency we already described, are:

1. Search volume: *Wiki* and *Blog* (google.com/trends) 2004-2006

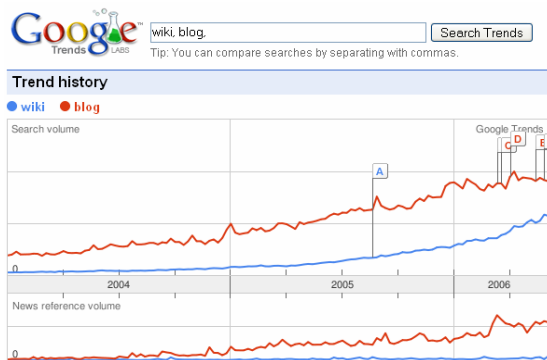


Figure 2. Comparison of wiki and blog search volumes.

2. Daily Reach –per million- *Wikipedia* versus *NYTimes* (alexa.com) 2002-2006

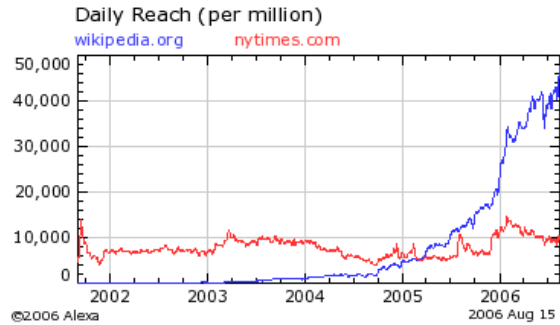


Figure 3. Daily reach: Wikipedia vs. NYTimes.com.

3. Linux users group World Wide registered. (i18n.counter.li.org) 1994-2006

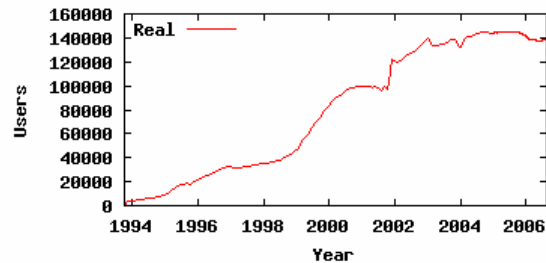


Figure 4. Linux user group user registrants.

4. Users Internet-connected computers in *SETI@HOME* project, University of California (space.com).

David Anderson, the director of this scientific experiment, used the Internet-connected computers of numerous users around the world to construct a mega-PC that is powerful enough to search for extraterrestrial intelligence. He explains that this research project has over 5 million participants, 10 times the original number of volunteers he originally expected (Lipman, 2000; Setileague, 2006).

The coming human-Web interaction and learning

Nowadays, there are more than enough examples of Web 2.0 as a technological revolution that impact multiple social fields by changing the way cybernauts interact with the Net, and, at the same time, how people generate

¹ For example: Knowledge/Innovation production model, Web 2.0, Open source or distributed-computer software

and share explicit knowledge with others. New spaces and channels of participation appear under the hacker influence of sharing knowledge in a horizontal and open structure. From this point of view, Web 2.0 and other collaborative technologies, make possible the conformation of *networks of innovation based on reciprocity*. This architecture provides social interchange spaces, especially relevant for the new paradigm of knowledge production and education (Harkins, Moravec and Kubik, 2006).

Considering the evolution of the technologies during the last 30 years, today we can project a constant duplication –in briefer intervals– of knowledge interchange and generation inside the digital architecture. In this new scenery, the evolutionary stages of the Internet (Web 1.0; Web 2.0; and future) will follow one to another with more intensity and frequency every time. The increasing acceleration of the knowledge production will generate deep changes in the pedagogical dynamics which can be afforded including the Web 2.0 tools we already described.

For example, the growing flows of information and knowledge (Lyman and Varian, 2003) will require that students and professors develop new technological skills and other cognitive abilities that allow them to manage greater volumes of information. It means that they will need to learn how to process and contextualize data and information to transform them into explicit knowledge.

The tendencies described in this article let us glimpse that the “learning communities” of this new paradigm of knowledge production and education will be capable to use the Internet to share their intellectual capital by connecting cognitive capacities and integrating individual *know-how* collectively, from many to many.

As it was explained during the World Summit about the Society of Information:

...ICTs are making it possible for a vastly larger population than at any time in the past, to join in sharing and expanding the base of human knowledge, and contributing to its

further growth in all spheres of human endeavor, as well as its application to education, health and science...
(Karklins, 2005)

As we can see, Web 2.0 brings a wide range of new applications that allow connectivity, interactivity and information management. But the most relevant quality of this revolution is that it makes possible a collaborative learning focused in the continuous innovation and knowledge production.

Today, more than ever, online technologies help us to achieve collaborative learning. Considering this perspective, educational institutions and their academics should understand it as an extraordinary chance to enhance their learning strategies.

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Editorial review: *Learning 2.0*

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This article discusses the possibility of a new paradigm of education. According to the author, this emerging educational paradigm reflects many of the characteristics exemplified by so-called *Web 2.0*, a new technology phenomenon (1). These characteristics include constructivism, innovation, a postmodern environment of knowledge generation, and collaborative intellectual capital. This is a timely and important topic given the rapidity of technological change, and Dr. Cobo deserves much credit for identifying and exploring possible implications for current educational systems.

One of the first assertions Dr. Cobo makes is that “users, teachers, and students, who have the most advanced knowledge,” can find numerous opportunities to make use of the new opportunities created by *Web 2.0*.² As a critical reader, I wasn’t sure how to interpret this assertion, or whether I agreed. Is the term “advanced knowledge” being invoked in terms of cognitive skills and abilities, particularly with regard to the body of codified knowledge taught in most formal education settings? Or does Dr. Cobo rather imply that users, teachers, and students are most likely to have the tacit, technological knowledge that would allow them to make use of the technologies represented by *Web 2.0*?

In the first instance, I question what advanced or formal codified “knowledge” means in the environment of *Web 2.0*, where the emphasis is on constructivist space and knowledge generation. In other words, does a student’s or teacher’s starting point with regard to relative “possession” of knowledge matter in an environment where knowledge is fluid and constantly being created for personal use? Is it even appropriate to use the term “advanced” knowledge? Or will there always be hierarchically perceived bodies of knowledge, along with acknowledged experts/wielders of such knowledge?

In the second instance, while the concept of advanced tacit knowledge makes sense, I question Dr. Cobo’s grouping of technology users, students, and teachers into the same category. Teachers, many of whom are technology immigrants (Prensky, 2001) or technology refugees, may be in a very different place than students, a growing number of whom are technology natives –that is, they grew up with technology instead of having to choose to learn it or ignore it. While it would seem to make sense that students are in a position to exploit the opportunities available through *Web 2.0* technologies, can they do so in formal educational environments where teachers remain authority figures and gatekeepers to new pedagogical practices? Although Dr. Cobo points to the need for new pedagogical practices, it would be interesting to hear his views on how this might occur. Will the nature of teachers’ authority and practice seamlessly change as part of a generational mindshift and flattening of access ensured by the ubiquity of *Web 2.0*, or will structural barriers become an even bigger

² To paraphrase, the author at different points defines *Web 2.0* as a new architecture which includes e-applications that allow the open interchange of knowledge and the interaction of many to many, instead of a few emitters and a lot of receivers. In Wikipedia, *Web 2.0* is defined as “perceived or proposed second generation of Internet-based services” (Wikipedia, 2006).

factor as change occurs exponentially (e.g., *Web 3.0* and beyond)?

This may be a particularly relevant question in low-income and/or fragile countries, where resources are fewer and students are less apt to have access to technology both in and out of school. But is also of crucial importance in developed countries, where growing social inequity is reflected in the education system.

Overall, however, Dr. Cobo provides thought-provoking analysis of what a new paradigm of education might look like. Drawing on the work of Harkins, Moravec and Kubik (2006), he describes this new paradigm as placing personally usable knowledge production at the heart of the learning process. It is an embrace of what Dr. Cobo calls the principals of ubiquity of use and reciprocal interchange, in a collaborative learning environment.

Although many of its defining characteristics may still be unclear, this seems to be a new way of conceptualizing education. More historical context in this area might be helpful – perhaps a comparison with recent paradigms of education, and a clear statement of what makes this paradigm fundamentally different than those of the past.

Within this broader framing of the changing educational landscape, an additional question is worth asking. Is Dr. Cobo suggesting 1) what a new model of education “could” look like as a preferred future, along with needed inputs; or 2) what is *likely* to happen given the impact of *Web 2.0*?

For example, the author states the new model of education will require students and teachers to be “digital alphabetized” in order to make better use of information technologies, to acquire new technological and cognitive skills, and new ways of processing and contextualizing

data and information. These are interesting ideas. They have crucial implications for the development of new pedagogical dynamics, as the author states.

If this is only a scenario of the future – one of many possible futures - it might be interesting to explore multiple educational paradigms reflecting characteristics of *Web 2.0*. This is because even if one educational paradigm ultimately emerges, different rates and types of convergence could call for a different set of educational interventions and pedagogical dynamics. Ditto for different educational paradigms.

Dr. Cobo makes a compelling case for the argument that new *Web 2.0* technologies such as *respositories* and *wikis* will revolutionize learning. Even more importantly, he points out that educational leaders and academics can empower students by embracing this shift now – a shift he terms a techno-social revolution. It is a message of opportunity. Dr. Cobo has made an important contribution to the dialogue on what technological evolution might mean for education. It is one that every educator should at least consider.

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