Education 2.0: bringing innovation to the classroom

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Abstract— **There has being a long waiting for computers to dramatically change education, but for the most part, that promise remains unfulfilled for various reasons. Perhaps the most important of them is the fact that, there hasn't been - so far - a computer application that would universally alter the educational experience. One that will make us stop seeing computers as an add-on, and start seeing them as integral to the full educational process. The advent of the Internet, however, and in particular what we are calling "Web 2.0", has so significantly changed our relationship to information and our own personal learning opportunities outside of formal education, that we're beginning to see a set of software tools emerge that are profoundly altering both learning processes and outcomes. In this paper the innovation that Web 2.0 brings to the classroom is discussed mostly from the technological point of view.**

Index Terms—**Educational Technology, Web 2.0, Education 2.0**

I. INTRODUCTION

BEING in the information era (though many futurists claim that we have passed into a posted-information age) it is rather straightforward to realize that a new agenda has been introduced in our lives, where Information and Communications Technologies (ICT) play an important role in regards to education, collaboration, communication, etc. Education (compulsory, higher schools, universities, etc.) seems to be a particularly important sector that is being influenced by new technologies, having in mind the important role that education has in today's world.

In the contemporary pedagogical theories, the cooperation between educators and students is considered as the most efficient way to learn in the so called framework of "active participation in learning". People that interact together are experiencing cognitive conflicts that drive them to new cognitive models. Students learn through the cooperation with other students. On this basis, cooperative activities which promote active learning are encourage, as well as respect to different approaches of a certain issue and emphasis on authentic – real situations [11, 12].

The Internet evolution that we have experienced the last two decades, and more specifically the so called *Web 2.0*, has as main characteristics exactly what was described above, with most important being the co-operative environment. Thus the question that arises is what innovative does Web 2.0 bring to the educational system where ICT has already (one way or another) taken its place.

II. WEB 2.0

Towards the end of the year 2006 "Time" magazine appointed as person of the year *each one of us*[1]. In the cover page of that issue, there was a photo of a personal computer (PC) and on the computer's screen the word "you" was written with the following phrase under it: *Yes you. You control the information age. Welcome to your world.*

The term Web 2.0[2], is used to describe the new "version" of World Wide Web (WWW) that is based on a new functionality that has turn users into producers (in contrast to consumers) and enable the cooperation in an easier and more systematic manner. Putting it in another way, Web 2.0 denotes a new dynamic platform where users may participate and interact, without the need for any special skills in ICT.

Web 2.0, as a term, was first introduced by Dale Dougherty (O'Reilly Media) in 2004 during a conference where new ideas where discussed for the next generation of WWW. There, it was concluded that WWW had been quite famous and important in everyday's life of a big fraction of people around the world. By then a lot of application were developed as well as web sites that were immediately recognized by the users within very short time. Moreover most companies had started to have as main business objective the WWW and as a result, wanted to bring along their partners and/or consumers. Within this framework, in that conference of 2004, Web 2.0 was studied as a second generation of services based on the internet. Furthermore they used this term as part of the title in a conference series that were to be organized in the next years.

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[1] Time's Person of the Year: You, http://tinyurl.com/yf54ud
[2] http://en.wikipedia.org/wiki/Web_2.0

These conventions are organized till today[3], (even if Web 3.0 or semantic web is nowadays the new trend) in order for Web 2.0 to be clarified, be promoted and new ideas and research presented in all the stakeholders.

III. ICT AND EDUCATION

The "Education for all" world conference that took place in Jomtien of Thailand in 1990[4] had as its main objective the confrontation of the serious educational crises that threaten the development of many underdeveloped countries. That forum introduced the notion of "Education for All" covering all ages from childhood to lifelong learning for elderly people as well as the "required knowledge and skill for better living and sustainable development". This vision is closely related with the educational system in all levels from local, regional, national and even international perspective. It recognizes that an educational policy can not cover everything and downgrades the importance of alternative educational approaches. The recommendation of the conference's committee was: "All available instruments and channels of information, communications, and social action could and should be used to help convey essential knowledge in order to inform and educate people on social issues. In addition to the traditional means, libraries, television, radio and other media can be mobilized to realize their potential towards meeting basic education needs of all" [1].

Despite the progress that took place around the world since 1990, the increase of the registered pupils in the formal school and the reduction of racial discrimination in education, the objectives of Jomtien did not succeed in many countries for a variety of reasons.

At the same time, last decade, the evolution of ICT continued to influence almost every human activity. Building above the vision of Jomtien, 164 governments in World Educational Forum of Dakar (April 2000)[5] were committed to ensure that until 2015 each and every child would be able to receive a high quality primary education, thus considerable extending the educational chances for children and youth ages, and thus reducing (double half) the levels of illiteracy end eliminating the racial discrimination in all levels of education.

As was mentioned by the secretary general at world economic forum in Davos in January of 2001, "it is impossible to have information for all unless we have education for all. This is the first priority in the private as well as in the public sector"[6]. Education for all is also the first priority of UNESCO, because education is at the same time a fundamental right of human being and the key for the sustainable growth and peace between countries. The meet of the objectives that were put in Dakar and in the Millennium Development Summit demands the engagement of all stakeholders for the quality and equality of the access to primary and secondary education.

In order to meet the goals that were mentioned above, it is absolutely necessary to make dramatic changes in the educational sector, both in the way that knowledge is conveyed as well as in the means that will be utilized towards this direction. It is inevitable that ICT will play an extremely important role, being in a continuous development and evolution, providing the appropriate means and tools to all those that are involved in the educational process. The role of the internet itself as well as the WWW, has to be distinguished especially as a platform of the support of the whole educational system.

The extensive relevant literature proves and elects the need of ICT inclusion in today's education [7, 10, 11]. Current technology is inevitable that has to support the educational process in all its forms. Nevertheless, the question that is yet to be answered is about the way that this is going to be realized. The introduction of ICT in education, encourages the active learning [12], whereas at the same time reshaping the role of the teacher in the classroom in such a way that he/she becomes a cooperator instead of instructor and a co-researcher together with his/her pupils. Digital tools give the ability to the pupil, not only act, but co-operate efficient for more effective processes and solutions. Additionally they enable them to experiment, observe, develop theories, realize their power or refusal, etc.

IV. WHAT NOVELTY DOES WEB 2.0 BRING TO EDUCATION

Going back to the definition regarding Web 2.0, let us mention what is referred in one of the latest BECTA reports [4]: "Web 2.0 is a catch-all term to describe a variety of developments on the web and a perceived shift in the way the web is used. This has been characterized as the evolution of web use from passive consumption of content to more active participation, creation and sharing – to what is sometimes called the read/write web". Based on that, the important innovation that Web 2.0 brings isn't some sort of technological revolution, rather the social networking and the new means of collaboration that is promoting.

The initial Web (Web 1.0) that was developed in the mid '90s, gave a tremendous push to the information access. The movement for "Open educational Resources" [8] is a typical example of the influence the Web 1.0 had to the education. Web 2.0 that took the lead in the recent years, promotes an even greater turnover. Tools and platforms like blogs, wikis, social networks, tagging systems, mashups applications and even content sharing sites are all examples of this new model were the user is in the center, that emphasis is given in collaboration rather than presentation, that strengthen and encourage focus discussions and sort briefs (like Twitter©) in contradiction to the classical "posting".

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[3] http://www.web2summit.com/web2009
[4] http://tinyurl.com/ye2ojkj
[5] http://www.unesco.org/education/efa/ed_for_all/dakfram_eng.shtml
[6] UNESCO, Address by Koïchiro Matsuura at the Special Session on the Global Digital Divide Initiative, annual meeting of the World Economic Forum, Davos, Switzerland, 29 January 2001.

Based on the abovementioned framework, the term "education (or learning) 2.0" has started to appear more and more in the international bibliography. In a recent study of the European Commission [3] the influence of web 2.0 to the education and the learning process is examined. The report summarizes the following messages – key points:

1) Social networking (and social computing in general) transforms the learning framework by providing huge potentials for self-guided learning, cooperative learning and life-long learning.

2) The use of social networks in education, even if it's starting within the educational providers, has a huge influence in the typical (classical) education. Thus it will assist its modernization which is necessary so the later can easily adapt to the new requirements.

3) The "education 2.0" phenomenon, "questions" the current educational models through: a) the transformation of the teaching process (pedagogical aspect), b) by placing new requirements in the administration of the teaching process (administrative aspect), c) by involving new educational tools (technological aspect) that contribute to a more complete and without discrimination education for the European citizens.

4) The boundaries between school and home, between formal and informal education, between teacher and learner, between education and entertainment, between content management systems and learning content management systems tend to become more and more blurred, more and more thin.

5) Although the current trend indicates that we are about to face a major change to the education as we know it, the deeper understanding of the "learning 2.0" phenomenon and its consequences to the learning process, to students, teachers, and to the educational system altogether, is still quite poor. Farther research and analysis is needed to a series of critical factors so that all aspects and angles can be fully understood.

A quite interesting research [4] that was conducted in Great Britain is providing insights on the current status of this phenomenon. In more details, regarding the issue of adapting Web 2.0 technologies in schools (second grade in this report) the outcomes were:

1) *Social networks*. The use of social networks (based on commercial platforms like Facebook© or Bebo©) is rather small (about 7.3%). The main reason for this low penetration is the concern regarding security and safety, technical difficulties due to access restrictions, etc. In the few cases that are being used, an advantage is that some kids are more familiar with electronic communication rather than with classroom discussion.

2) *Blogs*. Many school teachers are using Blogs. In several cases blogs are used for recording information, opinions and ideas, and for sharing good practices among teachers. Some use blogs as collaboration space with their students, by posting specific assignments and supporting the students through them.

3) *Wikis*. Teachers are quite excited with the potentials that these tools provide to them. A vast 75% are using wikis, whereas 32% as using them during classroom time.

4) *Discussion Forums and online chat*. More than half of the teachers are feeling comfortable using forums, but with online chat thing aren't that good. In more details, discussion forums (message boards) are considered especially helpful for the support of weak students and in conducting "peer" discussion among students.

5) *Upload and download of materials*. They are using them to some extent, but the majority of teachers tend to believe that students don't have the required experience to avoid safety issues (for this reason most school are banning YouTube).

Some Web 2.0 tools are totally missing from the schools that participated in this research. Tools like: collaborating editing, syndication, recommender systems, media manipulation and distribution.

V. THE GREEK REALITY

For Greece this is as well its Web 2.0 era. According to recently announced facts more than 1 million Greeks own a Facebook© account.

A large range of educational software and educational material (even of the "typical" form) is available through the official Ministry of Education web site (www.e-yliko.gr) for all school grades and for all disciplines. Free educational software and educational material is also available through the web site of the Pedagogical Institute (www.pi-schools.gr).

Several thousand blogs are owned and maintained by Greeks, and also several schools, teachers and professors are using them to enrich and differentiate their daily teaching practice. There are some 5,333 blogs hosted in the web site of the Greek School Network (www.sch.gr) that is exclusively supporting the educational community. Additionally some schools and teachers are hosting their blogs to various commercial hosts like www.blogger.com. Web 2.0 open-source tools are available to the school and to the educational community through the Greek Free / Open Source Software Society (GFOSS) (www.ellak.gr).

According to a recent study [14] of the Observatory for the Greek Information Society (www.observatory.gr), 85% of kids age 8-15 years are using computer, 15% of them own a Facebook© (www.facebook.com) account, 31% of them own a Hi5 (hi5.com) account, whereas the relatively smaller percentage of 11% are maintaining a blog.

Actions like the "ξεblogαρε" (http://www.kseblogare.gr/) initiative, that was a national students contest for the best blog, demonstrate that even the state is now concerned about this activities and wishes to expose their potential. We are witnessing the fact that now there are even Events and Congresses, with "Learning 2.0" [13] as a subject.

Some teachers, by utilizing the available gaps in the institutional framework for the teaching activity, have started using Web 2.0 tools in the classroom implementing projects based mainly on blogs and wikis (eg., eikona-politismos-alykeio-proastio.blogspot.com/, 1dimsar.eduportal.gr/, zanneio2007.blogspot.com/), and the ex-post evaluation gave positive results and hopeful conclusions. Mainly because blogs and wiki provide kids with a tools that allow them to be in charge, provide the needed space for collaboration, for exchange of toughs and ideas, for discussion and thus leading to a more personalized approach to knowledge. Kids are transformed for passive receivers – consumers to active speakers – creators.

The above pinpoint the fact that in Greece several good attempts and efforts are made as a response of the educational community to the challenges of this new era, at least from those having the required willpower, determination and creativity. We must also consider how many more steps must we take as individuals, as a society and finally as an educational system, to alter the way we learn, the way we develop, the way we leave.

In lieu of an epilogue let us take a closer look to the blog owned and maintained by a lower grade student from the island of Karpathos (ourland.terramythia.com/wordpress) that won the first price in the *ξεblogαρε* contest in the "lower grade school" category!

VI. Conclusions

A number of technological developments have come together to create new ways of using the Web. The new era (Web 2.0) has the potential to transform learning as well as the educational system as a whole. Nevertheless there are many considerations that have to be addressed and studied in depth in the days to come. Issues like e-safety, staff development, teacher's role towards effective learning, the engagement of the parents, technical infrastructure, etc., need special attention. The challenge, especially for policy makers and all of the education stakeholders, is to carefully study all the possible implications and provide a comprehensive picture of the issues relevant to using Web 2.0 towards the reshaping of teaching and learning.

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