



# Docencia e innovación

## Teachers Web 2.0 skills for professional development and education in the 21st century

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**Abstract:** The evolution of society and technology sustains the globalization of today's society and demands new literacies from citizens. Education in the learning and knowledge society is not dissociable from Information and Communication Technologies (ICT), both as a mediating and potentiating element of teaching and learning process. It is crucial that teachers understand ICT and social networking as a powerful way to restructure the teaching and learning environment, as well as to rethink how schools need to work in 21st century.

Data retrieved from two distinct doctoral studies revealed that teachers in non-higher education use Web 2.0 tools, including social networking, online office applications and blogs, for professional purposes. Teachers, in general, recognize the educational potential of these Web 2.0 tools and services. Our research showed that teachers are not frequent users of networks and that they prefer the generic ones to those of a more professional nature. Aware of the risks associated to social networking, but also of the need for constant professional improvement, these teachers recognize the importance of social networks in general as privileged instruments for sharing that contribute towards their update on curricular and pedagogical issues.

Conclusions point towards the need of schools to take up the incentive and adoption of strategies that might foster the development of ICT and Web 2.0 tools and services skills by teachers. This recommendation aims to constitute a pathway for the schools to promote the creation of social networks and educational communities and foster, from their use, the development of habits of collaborative work and sharing among teachers. That is to "equip" teachers in a way that empower them to face the challenges of the 21st century in education and so be able to better contribute to prepare their students for the global society.

**Keywords:** Web 2.0; Teachers Professional Development; Social Networks; Lifelong learning.

**Resumo:** A evolução da sociedade e da tecnologia sustentam a globalização da sociedade atual e exigem novas literacias aos cidadãos. A educação na sociedade do conhecimento é indissociável das Tecnologias de Informação e Comunicação (TIC), tanto como elemento mediador como potenciador das aprendizagens. É fundamental que os professores compreendam as TIC e as redes sociais como uma poderosa forma de reestruturar os ambientes de ensino e de aprendizagem, bem como para repensar o funcionamento das escolas no século XXI.

Os dados obtidos a partir de dois estudos distintos de doutoramento revelaram que os professores no ensino não superior usam ferramentas de Web 2.0, incluindo redes sociais, aplicativos de escritório *online* e blogues para fins profissionais. Na generalidade, os professores reconhecem o potencial educativo destas ferramentas e serviços Web 2.0.

A nossa pesquisa mostrou que os professores não são utilizadores frequentes das redes sociais e que preferem as de caráter mais genérico em detrimento das de caráter mais profissional. Conscientes dos riscos, associados à utilização de redes sociais, mas também da necessidade de constante aperfeiçoamento profissional, estes professores aceitam a importância das redes sociais em geral como instrumentos privilegiados para a partilha, como um contributo para a sua atualização sobre questões curriculares e pedagógicas.

As conclusões apontam para a necessidade das escolas incentivarem e promoverem a adoção de estratégias que podem fomentar o desenvolvimento de competências na aplicação pedagógica de ferramentas e serviços de TIC e Web 2.0. Esta recomendação tem como objetivo orientar as escolas para a promoção e criação de redes sociais e comunidades educativas e favorecer, pela sua utilização, o desenvolvimento de hábitos de trabalho colaborativo e de partilha entre professores. Isto é, "equipar" os professores para melhor poderem enfrentar os desafios do século XXI para a educação, na preparação dos seus alunos para a sociedade global.

**Palavras-chave:** Web 2.0; Desenvolvimento Profissional de Professores; Redes Sociais; Aprendizagem ao Longo da Vida.

### Introduction

Are teachers able to take advantage of technological tools to informally promote their professional development? On one hand, the utility of Web 2.0 tools for teaching and learning - connecting, communicating, sharing and collaborating, as the pillars of knowledge development in the global society is acknowledged. On the other hand teachers face new challenges as educators and professionals in the global society of the 21st century. This is the underlying research question of two joint investigations - a survey and a case study - that aimed to investigate to what extent professional networks, as informal learning environments, can contribute towards teachers' growth.

The evolution of society and technology sustains the globalization in today's society and demands new literacies from citizens. Education in the learning and knowledge society is not dissociable from Information and Communication Technologies (ICT), both as a mediating and potentiating element of teaching and learning process. ICT development has irreversibly changed the way people work, communicate, interact, invest, learn and spend their leisure time (Kozma, 2008). During the last decade evidence has revealed that a crucial shift occurred in the way knowledge is acquired, mainly related to the context in which knowledge is available, its characteristics and ways of dissemination (Siemens, 2006).

The generation of learners of the digital age, the "New Millennium Learners" or the "digital natives" use computers on a daily basis and are excellent multitaskers, easily shifting between tasks (Redecker, 2009). They are also autonomous and independent in their learning processes, but more outgoing and more involved in group work. The knowledge society expects individuals to be independent thinkers, collaborative, and "The critical community of learners ... encourages cognitive Interdependence simultaneously" (Garrison & Anderson, 2003) resulting from the fusion of two different worlds, an individual and a shared one.

Knowledge is built from the relationships and the interactions established between individuals (Siemens, 2006). Siemens described the basic principles of connectivism, a theory that aims to characterize learning in the digital era: learning and knowledge are drawn from a multiplicity of opinions, in a process of linking nodes or sources of knowledge. So, it is mandatory to nurture and maintain links between individuals, particularly through the use of Web 2.0 tools, through a learning process that combines conversation/communication, interaction, sharing, creation and participation (Downes, 2005).

Learning is a lifelong, permanent process, built individually or in a community (Siemens, 2006). Alongside the formal learning in educational institutions in order to obtain a certification or a diploma, there is non-formal learning, parallel to the above, which is not validated by a formal certification and may be provided by work institutions or through activities sponsored by organizations or civil society groups. Furthermore, informal learning is a non-intentional form of learning and results from everyday experiences (Longworth, 2003).

The contexts of informal learning are regarded as alternative learning models that are generally time-consuming, poorly organized, difficult to assess, but perhaps more effective in a process of changing practices and innovation (Moreira et al., 2009). Nonetheless, the formal context of teachers training can offer some gains, if supported by the use of social software and, at the same time, provide the required certification. This understanding can enhance formal training, creating informal learning approaches and environments that may increase a more reflective learning attitude.

As an alternative to a more formal training, informal training supported by Web 2.0 tools, well known by teachers who used them mainly for personal purposes, can facilitate their integration in online teachers' communities. Social networking is a potential informal learning context, because it promotes an inevitable exchange and sharing of knowledge and experience. Hi5, Facebook, Plaxo, Twitter, Ning and other 2.0 tools allow teachers to get in touch with the Web in an intuitive way and can lead to the professional development in a collaborative environment, providing not only the development of ICT skills, but also the scientific and pedagogical teachers' skills necessary to increase innovation in education and establish a better "connection" with their students – "The net generation" (Oblinger & Oblinger, 2005).

The report "Implementing Web 2.0 in Secondary Schools: Impacts, Barriers and Issues" (BECTA, 2008) gives further evidence that the use of Web 2.0 contributes to a greater autonomy and creativity, as it allows teachers to publish content on the Web, fosters collaborative learning activities and promotes the development of lifelong learning.

Web 2.0 has brought about a shift in the way the web is used. Web users have adopted an active attitude, by collaborating and publishing information, alongside with reading and researching. Moreover, teachers' professional development is an ongoing process in which the importance of lifelong learning in formal, non-formal and informal settings is recognized. In this context, social networks emerge as potential instruments for communication, interaction, sharing and collaborative work, contributing to the professional growth of teachers who are eager for continuous learning.

As Taranto et al. (2011) refer the world becomes more and more connected through advances in ICT and classroom experiences must reflect these changes. It is crucial that teachers understand ICT and social networking as a powerful way to restructure the teaching and learning environment, as well as to rethink how schools need to work in 21st century (Johnson et al., 2014).

## **Methodology**

The two distinct doctoral studies mentioned here (Antunes, 2012; Barbosa, 2012) aimed to contribute to a better understanding about the potential role of social networking as an informal learning environment for teachers, a survey and a case study.

The survey's objective was to describe the skills and uses of digital technologies by teachers of basic and secondary public schools from Aveiro, Portugal, (11 schools/groups of schools – about 1300 teachers), as well as their habits of importance these teachers attribute to social professional networks for their professional development. The skills and the uses of digital technologies refer to both basic ICT and social web skills. It was our intention to clarify if teachers consider the use of web 2.0 tools and services an important resource to develop their ICT skills. Concerning professional development, the study aimed to identify the perceptions of teachers about the growing importance of lifelong learning and informal learning contexts as a recognized way of facing the challenges of the knowledge society. Another dimension present in this study was the impact teachers believe can occur from their participation in social professional networks in their practices. The survey was designed in two phases. The first one, referred to the processes required to prepare the questionnaire application, that was, contact the schools administrators to obtain data about the number of teachers and students, and the local ICT coordinator contact.

Later on, ICT coordinators were asked to give information related with the school ICT resources and services, as well as about the school context and policies on ICT use. The second phase concerned the application of the survey questionnaire. With the support of the schools administrators and ICT coordinators, the main questionnaire survey was deployed to teachers (online survey), in order to get the data required to answer the research questions.

The case study aimed to analyze and understand how social networks, as tools to create and develop online learning communities, can contribute towards teachers' professional development. In particular, we aimed to explore the impact of teachers' participation in social networks on the collaborative work they develop within the online community and at school, as well as evaluate the impact of the use of a social network on the growth of a professional community of practice and verify the effects of these learning informal contexts on teachers' professional development. Thus, an online questionnaire was applied to the members of an online teachers' community - Interactic 2.0 - , and the interactions of these teachers in forums and blogs of some specific groups (inside Interactic 2.0) were analyzed. The case study design also contemplated interviewing Interactic 2.0 administrators to obtain data about their motivations to create this social network, as well as about their expectations and how they were being achieved.

From this joint research we expected to obtain significant data about teacher's motivations, benefits and obstacles to the development of communities of practice supported by social networking, and find evidence of impacts of their participation in such communities on teachers ICT skills and professional development. Simultaneously, we wished to contribute to promote a consciousness about the potential growth of innovative pedagogical "spaces" as a result of more collaborative work between teachers.

Finally, and according to a perspective that was common to both studies, we aimed to understand the teacher's needs to effectively consider their participation in a social professional network as another professional growth tool.

### **Main Results**

The results of these studies, described forward, were expected to raise the awareness for the need to prevent some flaws that condition the sustained development of teachers' social professional networking, so they can be minimized.

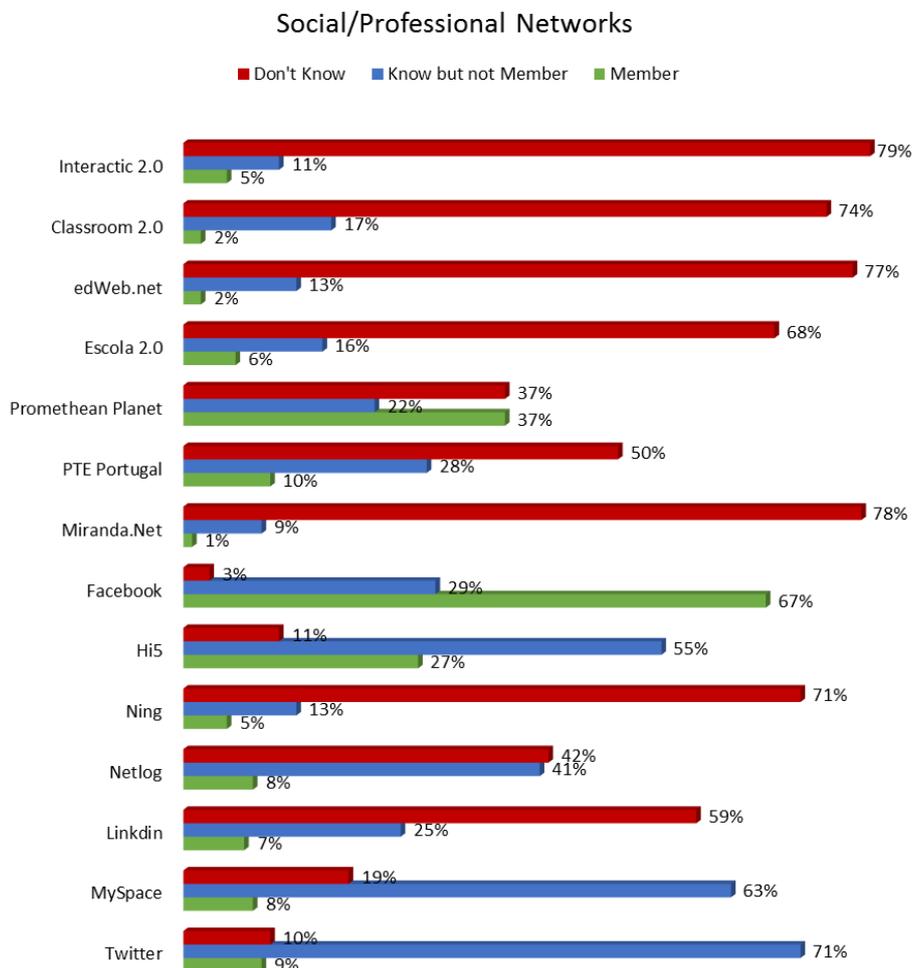
The data obtained from ICT coordinators of all the 11 schools involved in the study, first phase of the survey, provided information about the professional context of the teachers. This data was related with the school ICT resources and services, as well as the school context and policies on ICT use. They reported that the level of implementation of TPE (Technological Plan for Education) was high on what was concerned with infrastructure and equipment, namely computers, interactive boards and projectors. They also indicated that schools had webpage or site and mailing lists for teachers and staff. Moodle was in use for the majority of schools (82%), several had an official blog (55%) and a few less Facebook (27%). None of the schools had Twitter account and only two schools indicated they used online networks, such as Ning. About teachers ICT skills, 55% of ICT coordinators reported there was a deficit, and only one reported that teachers' weekly schedules included time for informal ICT development. Finally, they reported that teachers ICT professional formal development needs were regularly identified.

The survey second phase collected data from 244 validated responses (19%) out of a potential of 1300, representing teachers of basic (64%) and secondary (34%) public schools from Aveiro, Portugal and 2% didn't indicate their origin school. On average the respondents were teachers for 20 years, they were about 45 years old and mainly female (74%).

The first thing that popped up from the data collected was that the majority of the teachers inquired were members of social networks. Teachers declared they were members of at least one social/professional network, besides Facebook (74%). Even though, the tendency of response about their habits of use reported that it was generic

and low frequent. The major objective of being member of a network revealed by the data retrieved was entertainment and communication. We also found out that ICT policies in education had some impact on network membership, this was evident in the number of teachers belonging to Promethean Planet (37%).

Figure 1 – Social/professional networks membership



We found out that younger teachers, those who had of ICT preparation during their initial courses and that have less time in the job, revealed more tendency to be members of social professional networks. Similar findings were encountered among secondary teachers and those who considered themselves to be more ICT savvy.

Other results pointed out that globally, all teachers reported having access to ICT equipment (computer, internet and printer). Teachers considered that the equipment's they had at their disposal at school were sufficient in quantity as well as in quality, especially those working in secondary schools and members of networks.

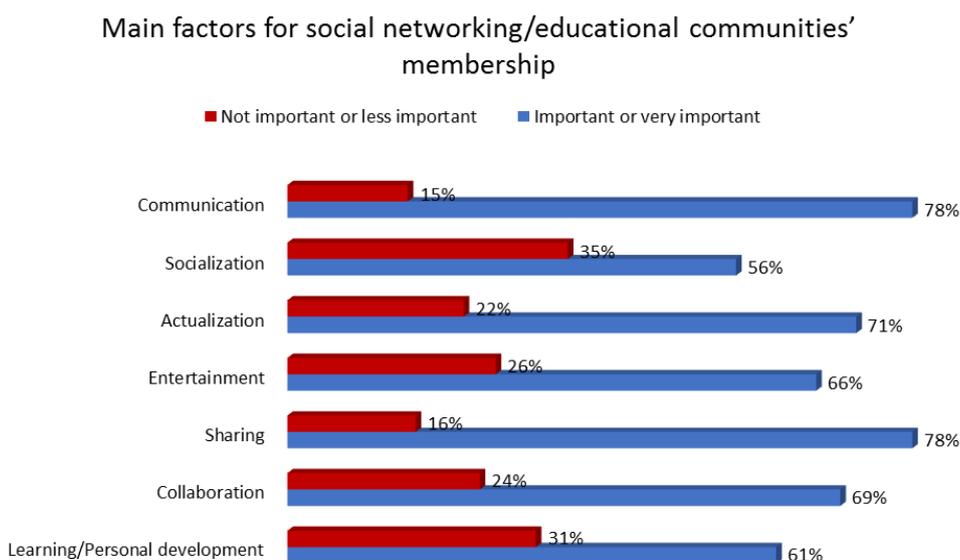
Teachers stated to be competent or very competent on basic ICT skills. About Web 2.0 tools and services, generally teachers reported to be little or no competent in the use of 3D immersive environments (76%), social bookmarking (72%), social professional networks (71%) and social networks (48%).

Concerning their Web 2.0 tools and services for their professional development, teachers globally considered themselves to be competent or very competent, namely determining the importance of the information found online (90%) and online search and use of resources to clarify doubts or solve problems (88%), as well as evaluating their credibility and developing autonomous learning processes with the technologies (74%). The teacher's responses revealed some difficulties concerning being part and

participating in social professional networks (46%), teamwork (44%) and projects development with technology (35%).

As figure 2 shows, teachers indicated as main factors for social networking/educational communities' membership, important or very important, communications and sharing (78%). Regarding the main obstacles, teachers considered as crucial, time availability requirement (84%) and excess of emails/communications online (79%). Concerning the impacts of the use of social networks/educational communities in professional development, teachers recognized as important or very important advantages, the access to information and/or diversified resources and information/contents sharing (83%), as well as the nonexistent geographical barriers (78%) and real time collaboration (78%).

Figure 2 – Main factors for social networking/educational communities' membership



More specifically in terms of use or participation in social networks/educational communities the teachers felt as important or very important, the contribution to the development of their ICT skills (71%), sharing knowledge and personal experiences (69%) and professional communication and collaboration encouragement(68%).

In 2011, Interatic 2.0 was a community of almost 2.400 teachers and 29 different groups. The results of the 252 valid and complete answers obtained allow stating that there is a prevalent interest in the integration of social networks in educational practices, for 126 teachers expressed this need. Not surprisingly, they consider they have the required skills and the confidence in those skills. However, a considerable number of members of this community agree that need training in this area (Figure 3).

When asked to explain the dimensions in which Interactic 2.0 was important for their professional development, respondents pointed out that the community had a high importance to enable familiarity with Web 2.0, by allowing the sharing of resources and information with educators and enabling the integration of ICT in teaching and learning (Figure 4).

The analysis of the interactions establishes that the focus of one the Interactic 2.0 group members' "Web 2.0 - educational tools" is sharing knowledge and resources, but they are still unable to free themselves from the individual level and develop collaborative work to define shared goals and jointly build artifacts.

Strictly at a professional level, most Interactic 2.0 members expressed its preference for Facebook, following current trends as this is the social network with more fans in Portugal. It's clear that teachers do not neglect the opportunity to make use of social networking possibilities as a motivating informal learning environment, integrating them in a conscious way in their teaching practices and in their professional development.

Figure 3 – Training needs

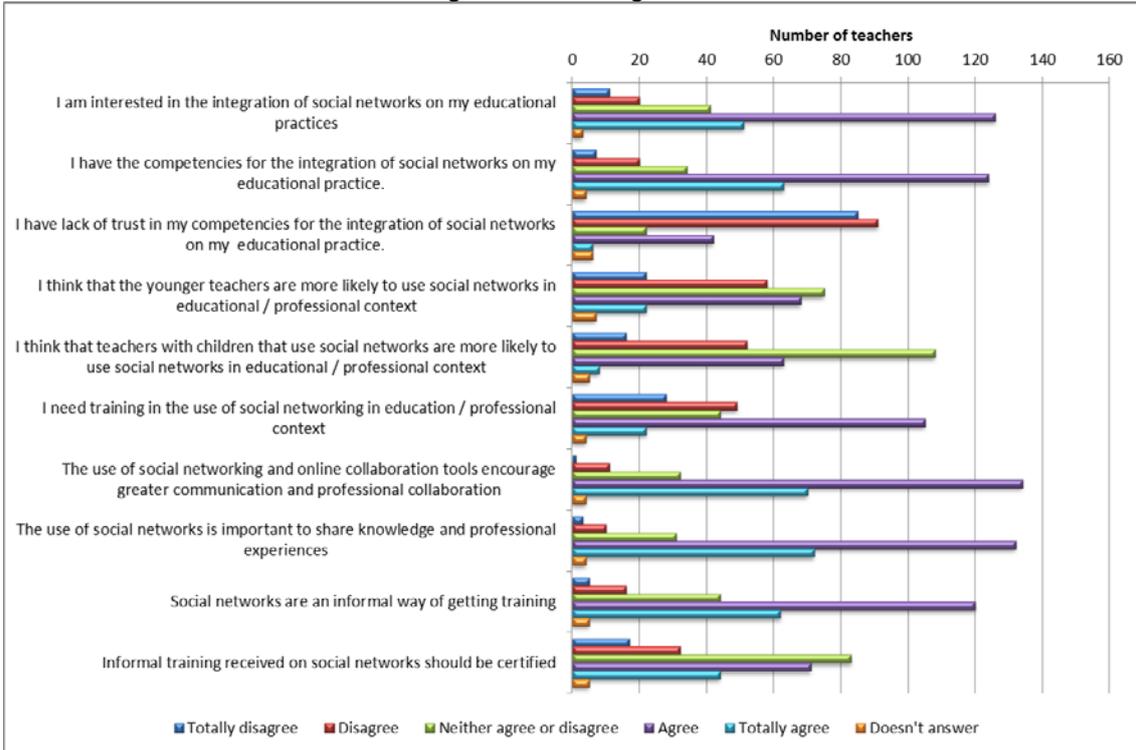
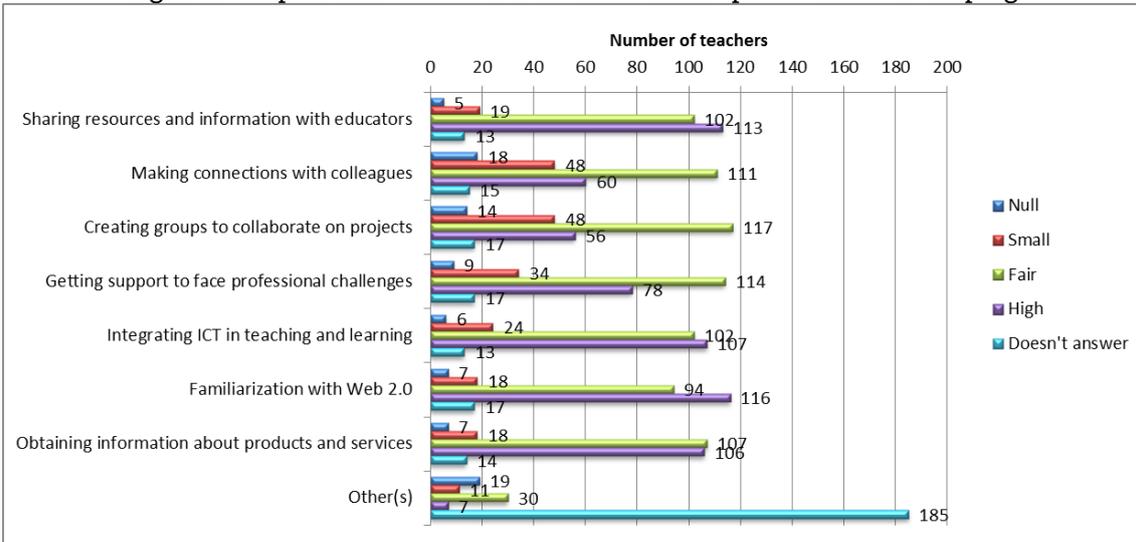


Figure 4 – Importance of Interactic 2.0 for teachers' professional developing



Interactic 2.0 members consider that social networks have a great potential, both personally and professionally, since they are a great contribution to teachers learning, motivation and personal and professional growth.

Participation in Interactic 2.0 is seen as important to improve teachers ICT skills and to develop reflective attitudes about teaching practices. However that's not a decisive factor to promote collaborative work in this community. Data from the questionnaire indicates that a large number of respondents sustains that participation in Interactic 2.0 is not decisive for the increase in collaborative work, although some of its members collaborate in achieving some projects. Nevertheless, a large number of respondents stated that Interactic 2.0 not only contributes to a better integration of ICT in teaching activities, but also contributes to enhance their ICT skills and contributes on the whole to their professional development. Interactic 2.0 has

grown in relevant way and teachers reported that it seems to be sufficiently dynamic to endure in time.

These results allow us to see the reality of the problem on the basis of the research, the gap between the presence of technology in society and at school. The similarity of the evidence found in other studies, e.g.. Yuen & Yuen (2010), teachers recognize the educational potential of the Tools/Web 2.0 services, but do not feel responsible for their use can fully integrate their teaching activities. More, teachers are not taking advantage of the potential of technology for their professional growth and continue to base it in the provision of continuous training. It is important to adopt new strategies and training, in particular to schools to encourage the development of digital skills to ensure equity in access to social networks/educational communities by teachers.

The educational potential of Web 2.0 services and tools, especially social networks and educational communities of practice were not clearly recognized for informal CPD.

In face of these results we consider that the use of social professional networks as learning tool for informal CPD is made by the teachers who are in an early adoption stage of these practices as lifelong learning routines. As in other processes of integration/adoption of ICT in education – these are a minority of ICT enthusiastic teachers.

### Conclusions

Data retrieved from the two distinct doctoral studies revealed that teachers in non-higher education use Web 2.0 tools, including social networking, online office applications and blogs, for professional purposes. Teachers, in general, recognize the educational potential of these Web 2.0 tools and services. Results also point towards an improvement of teachers' ICT skills, especially at the level of basic competences, when compared with previous studies conducted in Portugal, such as, for example Paiva (2002), Barbosa (2009) and Brito (2010). Our research showed that teachers are not frequent users of networks and that they prefer the generic ones to those of a more professional nature. Aware of the risks associated to social networking, but also of the need for constant professional improvement, these teachers recognize the importance of social networks in general as privileged instruments for sharing that contribute towards their update on curricular and pedagogical issues.

Main conclusions point out the need to redefine actual CPD model, supported in opened learning theories that can result in a more efficient model towards the development of teachers ICT skills. They also point out the necessity of a major incentive from the schools to promote the adoption of strategies that can move ICT/Web 2.0 skills forward, assuring equity on the access to social/professional networks by all teachers. Schools must create their own networks and stimulate their use, collaboration and sharing among teachers.

This is the way to contribute to make teachers able to follow the unstoppable technological development and potentiate teachers' skills, as well as take advantage of it as lifelong CPD tool and in this way better equip teachers for the educational challenges of 21th century, preparing young students for the global society.

Conclusions point towards the need of schools to take up the incentive and adoption of strategies that might foster the development of ICT and Web 2.0 tools and services skills that can guarantee equity in the access to social networks and educational communities by teachers. This recommendation aims to constitute a pathway for the schools to promote the creation of social networks and educational communities and foster, from their use, the development of habits of collaborative work and sharing among teachers, contributing to improve the teachers' skills in keeping pace with technological evolution and in the access to other lifelong professional development opportunities. That is to "equip" teachers in a way that empower them to face the challenges of the 21st century in education and so be able to better contribute to prepare their students for the global society.ç

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