

HOW ITALIAN PHD STUDENTS REAP THE BENEFITS OF INSTITUTIONAL RESOURCES AND DIGITAL SERVICES IN THE OPEN WEB

Antonella Esposito¹, Albert Sangrà², Marcelo Maina³

¹*University of Milan (ITALY)*

²*UOC – Open University of Catalonia (SPAIN)*

³*UOC – Open University of Catalonia (SPAIN)*

aesposito47@gmail.com, asangra@uoc.edu mmaina@uoc.edu

Abstract

The topic of the impact of Web 2.0 ecologies on the learning contexts of PhD candidates is of particular interest for innovation in higher education teaching and learning. However, this theme results so far underresearched in literature, in particular in the Italian higher education setting.

The present paper reports selected findings from an exploratory study investigating how individual doctoral researchers cope with competing institution-led and self-organized, analogue and digital opportunities for learning. This article is based on preliminary results of an online questionnaire which was delivered between September and October 2012 across three Italian universities. The questionnaire aimed to describe the components (people, resources, tools, people and related interactions) of the emerging learner-centered “ecology of resources” [1], characterizing individual doctoral students variously dealing with their needs of support and striving to achieve their being ‘independent researcher’. The surveyed Italian doctoral students seem to be usual adopters of social media in their everyday life, but there are also signs that they are currently adopting tools and services available in the open Web to undertake activities usually required in their doctoral programs. The research participants show a pragmatic attitude towards the Web 2.0 services and state to be prompted to use such tools mainly by ‘occasional, practical needs’ related to their research activity. Although very few respondents actually curate an ‘academic’ presence in social media, they generally credit the social Web with a wider, still unexploited potential to improve some research tasks. Finally, it is worth noting that the provision or lack of specific research training on these emergent tools plays a key role in the indicated motivations. This early portrait of the emerging learning ecologies of current doctoral researchers sparks cues for reflecting on the extent to which the design of formation of future scholars should take into account changes occurring in learning spaces, also in the light of new forms of networked scholarship being pioneered in the social Web.

Keywords: doctoral students, learning ecologies, digital researchers, Web 2.0 tools.

1 INTRODUCTION

In the last decade a new generation of popular technologies underlying ideas such as architecture of participation, user-generated content, openness and collaboration as a whole have constituted the so called ‘Web 2.0 approach’ [2] or ‘social Web’ [3]. This ecology of digital tools and environments evolving along with the user engagement has enabled “new learning cultures” [4] as well as emergent forms of digital scholarship [5] in higher education. On the one hand, in teaching and learning approach a different, democratized conceptualization of academic authority [6] is suggested and a peer-to-peer approach to student’s participation in the process of knowledge production and dissemination is advocated. On the other hand, a shift in scholars’ behaviours is also prompted, thanks to emerging networked scholarship practices [7], which enact an extended culture of sharing in academia. From an institutional viewpoint, Hicks and Graber [8] discuss current projects of Web 2.0 applications designed to improve student and faculty engagement in the research process. Otherwise, Dabbagh and Kitsantas [9] acknowledge that universities still rely on ‘traditional’ e-learning platforms and do not generally take into account the students’ ‘personal learning ecologies’ [10], being produced

by the pervasiveness of social media and the ownership of digital devices. Indeed research-based empirical studies give evidence that it is more appropriate to refer to an increasing diversity of digitally-mediated behaviours by students rather than to a 'digital natives' generation [11] [12]. Furthermore, it is proven that the celebrated new channels of communication are not superseding the traditional ones among faculty, but are slowly emerging [13] [14].

Thus, a focus on doctoral researchers – and in particular on their emergent digitally-mediated practices - constitutes a key research topic to gain further understandings on students' experience of e-learning in higher education [15], as an informed basis for universities to design new ecologies for (research) learning. In fact, the PhD candidates have typically hybrid profiles of students and scholars which can provide insights both about digital learners in universities and future (digital) scholars in academia. The first step to explore the impact of Web 2.0 applications on the organization of a doctoral journey aims to detect the extent to which doctoral students are actual adopters of social media for research purposes. This paper presents the preliminary findings of a research in progress on learning ecologies of doctoral e-researchers in Italian higher education. Specifically, it focuses on selected results of an online survey, aiming to answer the following research question:

- To what extent do Italian doctoral students learn to become researchers using digital tools and networked environments?

The online questionnaire investigated the environmental factors in which the doctoral experience occurs and the current uses of technologies on the part of individual doctoral students enrolled in doctoral programs across three Italian universities. The aim was to collect useful elements to draw the "ecology of resources" [1], characterizing the academic activities of these postgraduate researchers. In other words, the research sets out to indicate people, support services, digital tools and material resources with which PhD students usually interact. Such data could help to cover the lack of information "on synergies between participation in technologically mediated informal learning activities and more formal educational environments" [16].

The following sections briefly account for the previous research on which this study is based, illustrate the adopted methodology, present and discuss findings and foregrounds future research.

2 BACKGROUND

This section briefly accounts for the literature resources on which the construction of the questionnaire and the conduct of the research are based.

2.1 The 'digital' in doctoral education

Although there is a variety of modes in which a doctoral journey can be considered across diverse disciplinary areas and university contexts, it is possible to agree on three common, interrelated threads characterizing the identity formation of a scholar [17]: 'intellectual', representing the contributions to disciplinary knowledge; 'networking', or the continuing interweaving of research bonds constituting the community of practice, and 'institutional', that is the ensemble of relationships and forms of support being provided by the university in which the individual doctoral student is located. Apart from the intellectual strand, which is not the object of this article, networking and institutional strands can be considered according to digitally-mediated practices. In this line, Kalb, Bukvova and Schoop [18] provide a framework to categorize typical individual research activities – such as early exploration of topics, information retrieval of specific themes, critical discussion and academic writing – that can validly be supported by technology. Moreover, a doctorate can be diachronically considered, stressing the fluid 'developmental phases' [19] which shape the progressive evolution of the individual apprentice researcher from a more accentuated 'guided' phase towards a greater autonomy and agency. Also in this case, different kinds of technology-mediated support can be taken into account to enhance the doctoral experience.

Moreover, whereas the organization of doctoral programs at a distance is still limited to a few cases, it is worth noting that the networking needs of a doctoral researcher starting her/his dissertation project cannot be narrowed within the boundaries of an institutional e-learning platform [20], since they usually require a specific niche community that is easier to find both in conventional (seminars, conferences) and in emergent venues (e.g. social networking sites). Focusing on the different levels of impact of the 'digital' on research practices, research training and formats of dissertations, Andrews, Borg, Boyd Davis et al. [21] underline the occurring shift towards an idea of dissertation as a process rather than as a product. The related practices are being enabled by the use of social networking sites

to publish rough ideas and early findings and seems to be aligned with the dire need of early building an academic identity (and related career path) by new researchers.

2.2 The potential of Web 2.0 for apprentice researchers

The potential of a Web 2.0 approach in doctoral education has recently been discussed within an ecological perspective of knowledge creation, in which an increasing overlapping between the digitally-mediated modes of knowledge production and distribution in e-learning and e-research instances makes the Web 2.0 approach “resembling academic world” [22], and prefigure new forms of doctorates.

As regards to doctoral practice at an individual level, it is increasingly acknowledged that social media provide a variety of opportunities for doctoral students. Millan and Bromage [23] underline the possibilities for contacting new scholars, research collaboration and sharing datasets. Networked environments also play a key role in the efforts to build an academic identity by prospective researchers [24]. Heinz, Joubert and Gillet [25] account for a need analysis conducted to build an online community of practice aiming to enable research 2.0 practices among PhD students in technology-enhanced learning: what emerged from their inquiry was that doctoral students seem to personally select Web 2.0 tools for specific purposes, but hope for support in searching and filtering information useful for their research interests. Zaman [26] builds on Gardner [19] to provide a matrix to help the interpretation of how these tools can usefully support the different developmental phases experienced by of a doctoral student and foster a more collaborative research approach: she points out the areas of the ‘research awareness’ (the opportunities to exchange information to solve doctoral problems and search job offers), ‘research networking’ (the advantage to easily reinforce global access to researchers) and ‘research management’ (the opportunities for data, bibliographies and texts storage) as main areas of impact of Web 2.0 tools. Meyer [27] reports controversial findings related to the acceptance of new tools in a doctoral level course, but she concludes that Web 2.0 instruments can draw learners’ attention towards the process of learning and alternative ways of accomplishing their goals. Finally, Coverdale [20] stresses the importance of social media to disrupt “institutionally bounded research sites with new discourse communities and networks that are more socially constituted, timely and participative”. However, he underlines concerns such as privacy, confidentiality and risk of an early exposure to the academic community that can prevent doctoral students from a wider adoption of Web 2.0 tools. Such stances suggest the need for a reality check, in order to reveal the actual conditions in which doctoral students develop their journey in the social media age.

2.3 The adoption of Web 2.0 tools by PhD researchers

According to recent large-scale studies, Web 2.0 tools (e.g. blogs, wikis, twitter, social networking sites) are not generally cited as popular mechanisms and are even seen as a “waste of time because they are not peer reviewed” [13]. Such results are also confirmed by small-scale inquiries, such as Kraker & Lindstaedt’s [28] carried out in the e-learning research field. However, it is also proven that among social media adopters in academia these applications demonstrate an actual impact on the research workflow [29].

Likewise, the digital landscape is also varied among apprentice researchers. Across UK universities Web 2.0 technologies are proven to be increasingly spread among PhD students [30]. In general, early career researchers [31] state to use a number of ‘old’ (including ‘email’ as the key tool) and ‘new’ technologies: in particular, they show a great flexibility in adapting their digital behaviours to supervisors’ and peers’ technological preferences. However, findings related to the frequency of usage of new tools reveal some surprises in favour of older generations of researchers [32]. Elsewhere [30] a prevalent passive attitude and a scarce creativity in ICT use is attributed to PhD students. Moreover, a survey addressing scholars in international academic contexts [29] prefers to apply the innovation types’ model devised by Rogers [33] to identify profiles of ‘early adopters’ of social Web tools, rather than featuring any young generations’ innovative approach. However, for doctoral candidates [31] a local research environment hostile towards tech innovations (e.g. innovations perceived by senior scholars as frivolous or time-wasting) and the lack of institutional support (e.g. the blocking of social media web sites) are significant factors that can hold new researchers back from the adoption of new tools. Likewise, considering research universities in US context, Harley et al. [13] hold that is unlikely that young scholars can actually innovate research practices, because these apprentice researchers usually rely on behaviours and discipline-bounded conventions followed by senior scholars, in order to advance in their career.

In line with the above findings, an interview project carried out across the University of Milan, in Italy [34], gives some evidence that senior, young and doctoral researchers generally demonstrate a functional and efficiency-driven approach to digital tools and in particular they show a cautious interest towards Web 2.0 services to support inquiry activities. However, among the interviewed researchers a few champions emerge (including doctoral students) with an eclectic and self-legitimizing approach to new technologies of communication, despite the respective disciplinary contexts are fairly indifferent to the potential of new digital tools/environments. The present inquiry was designed to expand this early study grounded in Italian higher education.

3 METHODOLOGY

The online questionnaire was planned as a starting point for this exploratory study, in order to provide breadth to the investigation, to let early patterns emerge and use these to generate new questions for a subsequent research phase. Although questionnaires are ordinarily used in quantitative research [35], they can also constitute a valuable instrument to collect data - such as self-reports - that can be qualitatively analyzed [36]. The choice of this technique to collect data appears to be low cost, efficient, suitable to maintain anonymity of would-be informants and aligned with the networked attitudes of doctoral researchers to be investigated. The adopted typology of questionnaire – a questionnaire delivered via email - matches what Cohen, Manion and Morrison [36], describe as a “volunteer sampling” of respondents. In fact, it is easy to ignore an email received among other administrative communications: therefore volunteer respondents are ideally willing to contribute to the research and have at least a tentative opinion on the topic being investigated. This feature fits the purpose of reaching social media users among doctoral students, in order to map out the characteristics of the context in which they are learning to become researchers. Furthermore, “maximizing variation” [37], of the survey’s responses is here considered as main validity approach to be pursued in the application of this data gathering technique.

The selected research setting consists of three universities located in the North of Italy: University of Milan, University of Milan-Bicocca, Polytecnic of Milan. They have different dimensions but a relevant and varied doctoral education’s provision, in subject areas that to a great extent do not overlap. In fact, main criteria adopted to select the university contexts refer on the one hand to opportunity’s reasons such as to be well acquainted with the context or have previous direct knowledge of their features; on the other hand it was considered the variety of research areas (and related range of doctoral programs) that universities provide, so as they can be representative of a number of disciplinary cultures and settings.

The questionnaire was built on the basis of previous large scale empirical studies above mentioned. Moreover, the areas of activities that are more likely to be technologically supported [18] along with a ‘balanced scorecard’ of academic activities (research, authoring, networking, teaching, administration) defined by the LSE Policy Group [38], were considered. Furthermore, a series of informal interviews to directors of doctoral schools and doctoral programs of different broad subject areas (Humanities, Social Sciences, Physics, Education, Pharmacology, Anthropology, Engineering) were carried out across the three selected universities, in order to assess the different options of institutional services, initiatives and informal forms of assistance that doctoral students can actually harness in their academic contexts.

The questionnaire was created comprised of 32 closed questions and the possibility to add open comments. It was administered online through a social media free service called SurveyMonkey and remained open for one month, between September and October 2012. It was delivered by email (including a reminder) to all the doctoral students enrolled in the three universities involved in the inquiry. This was possible thanks to the collaboration of the local doctorate offices. This collaboration allowed to use the official mailing lists of the doctoral students and so to match the sampling frame with the actual population of the informants [39]. On the other hand, anonymity was ensured both on the part of the doctorate offices, that could not access the filled out questionnaires, and on the part of researcher, who could not access contact information, unless the individual respondent voluntarily indicated it. This paper reports some descriptive statistics drawn from an early analysis of selected results of the closed questions.

4 KEY FINDINGS

A selection of key findings is reported below, following the order of the sections in which the questionnaire was organized.

The participation rate in the survey was of 20% (624 respondents), considering a population of about 3.000 doctoral researchers enrolled in the three universities being involved. The participants belongs to about 20 different subject areas: Engineering (with 87 respondents), and Nature Sciences (with 7 respondents) represent the two outliers. The remaining areas can be clearly divided in two groups, as indicated in the table below (Fig.1): nine areas in which repondents vary between 21 to 40; seven areas in which participants are less than 20.

21 to 40 respondents	< 20 respondents
Humanities	Human Sciences (Psychology, Anthropology)
Biotechnologies	Environmental Sciences
Information Technology	Education
Economics	Agriculture
Maths	Veterinary
Architecture and Design	Law
Chemistry	Pharmacology
Physics and Astrophysics	
Biology	
Social Sciences	
Medicine and Health Care	

Fig.1. List of subject areas per range of respondents

4.1 Demographics of the respondents and organization of doctoral activities

Almost the totality of respondents is componed by Italian students (553 compared with 71 foreign students). 89% of respondents are awarded a scholarship to attend the doctoral programs. Their distribution across the three years of formal enrollement is fairly balanced (about 33% each year), with a slightly greater group enrolled in their third year of doctorate (34%).

As regards to the age range, 79% of respondents is positioned in the range of 25-30 years old, 10% in the range of 31-35, 5% is more than 35 and only 3% is less than 25.

4.1.1 Doctoral environment and institutional services

A group of questions was submitted in order to collect information about the modes of study/work as well as the physical and digital locations and services in which the PhD students mainly attend the taught component, if any, of their doctoral program and undertake their research apprenticeship.

The prevalent mode of study and work during the doctoral journey is stated to be the 'isolated mode' (with a rate of 64%) against a 36% declaring to usually carry out their doctoral activities in a team. Most students state to primarily work in their own office rather than in open spaces, but also in university labs. Moreover, the most frequent modes of interaction with their supervisor are the regular in person meetings (56%), supplemented by email (36%), while web conferencing services are adopted only by 1% of respondents. On the oher hand, lectures (cited by the 25%) and seminars with guest scholars (by the 27%) represent the most common form of research training, while summer schools (15%) and seminars among peers (14%) actually have relevance. On the contrary, the practice of virtual seminars results to be still an exception (only 1% mentioned it), and tech sessions about literature search strategies and subject-focused methodologies are less cited than expected (each at 8%).

Participants were also asked to point out the typologies of technologies being provided by the institution and those actually being used. As expected, email and digital library services appear to be the most used tools/services across all the disciplines. Only 46 responses highlight that some doctoral programs officially adopt Web 2.0 applications together with more traditional digital services. A group of responses points out those technologies related to medical or techno-scientific subject areas: lab technologies (91), text/data mining (13), supercomputers (8), grid computing and 3D technologies (6), geo-spatial tools (5), cloud computing (4). But what clearly emerged is that doctoral students are less

exposed to institution-bounded e-learning platforms than their younger colleagues: for instance, the presence of VLEs or E-portfolios is practically nonexistent.

4.2 Adoption of Web 2.0 tools

4.2.1 Web 2.0 tools in PhD students' everyday life

The PhD students were asked to list social media that they daily use for general purposes (Fig. 2). A varied ecology of tools emerged, where audio/video sharing and production services stand out, along with the online attendance in general social networking sites such as Facebook.

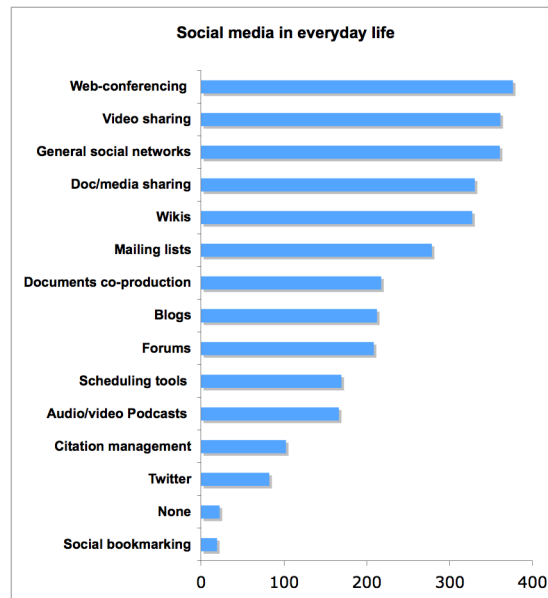


Fig. 2 – Frequency of Web 2.0 tools being adopted

4.2.2 Web 2.0 tools for research purposes

In Fig. 3, scholarly search engines (such as Google Scholar) appear, as expected, the most cited applications for a research purposes, whilst web conferencing tools and instruments for documents/media sharing maintain a high relevance for most of the respondents. Moreover, a passive use of wikis (consultation) appears to play a role also in the doctoral work, whilst reading blogs is not particularly valued.

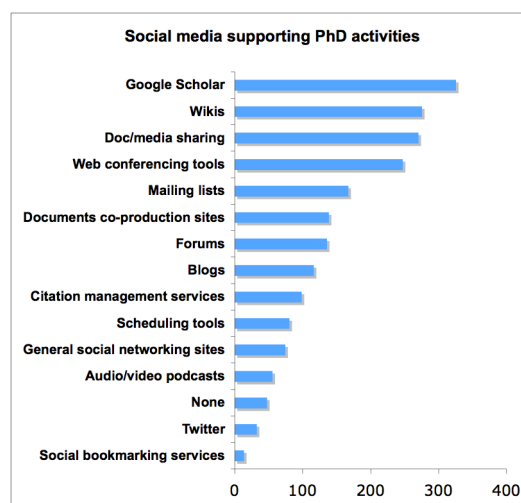


Fig. 3 – Frequency of Web 2.0 tools being adopted

Some differences in the top three preferences can be noticed across subject areas: for instance doctoral students in Economics seem to prefer wikis, open search engines and mailing lists, whilst

students in Social Sciences indicate at the top open search engines, documents/media sharing services (e.g. Slideshare, Dropbox) and web conferencing tools.

On the other hand, when asked about the management of an academic profile in any blogging, microblogging or social networking services, the rates are remarkably lower: running a blog as a journaling activity is declared just by the 3% of the participants (14 responses), curating a Twitter account by the 8% (39), whilst 11% of the respondents (83) state to have a profile in research-focused social networking sites.

4.3 Use and potential of Web 2.0 tools

4.3.1 Activities related to the actual uses of Web 2.0 tools

Participants were also asked about any actual use (in terms of frequency) of social Web tools in some defined individual scholarly activities (Fig. 4). Social media are likely to be *regularly* (dark blue line) or *often* (rose line) adopted in individual activities such as early exploration of a topic and information retrieval on a specific topic. It is apparent that social media are not currently adopted as a venue to practice academic writing (light blue line).

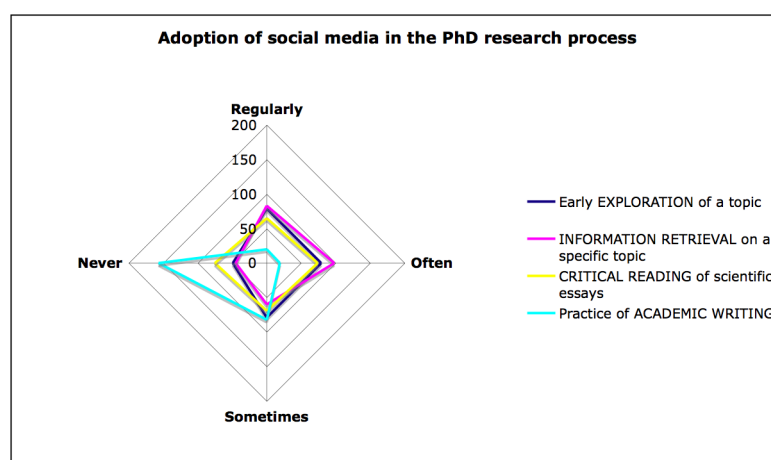


Fig. 4 – Trends in the adoption of Web 2.0 for areas of activity

4.3.2 Modes of networking

How do Italian PhD students mainly build their research-focused relationships during their doctoral journey? 37% of PhD students rely on the traditional channels of communication such as seminars and conferences to meet peers and get to know new experts in the research field. Likewise, informal meeting at the university are important for 29% of the sample. On the other hand, suggestions from the supervisors are relevant for 19% of respondents. The networks being curated by the individual researchers in the open Web weigh in the 6% of the cases, similarly to password-protected mailing lists and forums (6% of the respondents).

4.3.3 Drivers and inhibitors in the adoption of new tools in the research process

The 'nature of research field' is considered neither a particularly relevant driver nor a strong inhibitor in the adoption of new technologies. On the contrary, practical needs occurring in the research process are mentioned as main driver (23%), together with the personal curiosity of experimenting with new technologies (19%). Among main inhibitors there is the lack of time (for experimenting) and above all the uncertainty about which kinds of instrument is more appropriate for a specific need and situation. Moreover, the presence or lack of related research training on these emergent tools plays a key role in the given responses.

4.3.4 Potential of the social Web to support doctoral activities

The participants were asked to indicate in a Likert scale the potential value they assign to the social Web to support the following broad academic activities: Project management, Data collection, Networking, Updating, Critical discussion, Personal development. As the spider diagram highlights, in general doctoral students orientate their choice towards the 'High' value label, with a slight drop related to Project Management and Critical discussion. However, the activity 'Updating' revealed a clear shift towards a positive attitude, since a peak in 'High' and 'Very High' value attribution is

highlighted. On the contrary, a negative peak is reached as regards to 'Critical discussion', in which the summed responses of 'Low' attribution is equal to 'High' labels.

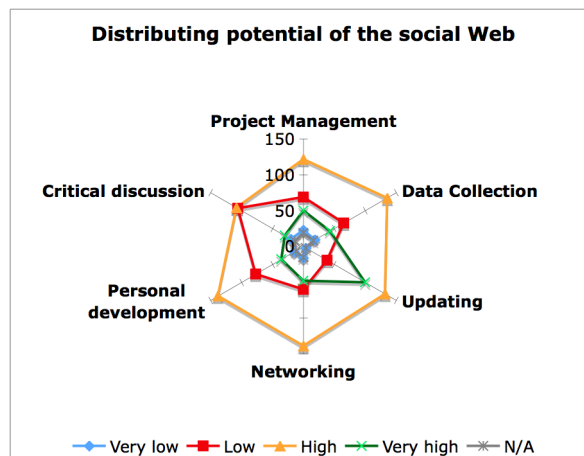


Fig. 5 – Expectations of the potential of social media for specific academic activities

5 DISCUSSION

The Italian PhD students participating in the survey seem to be usual adopters of social media as well as of more traditional web-based technologies in their everyday life. However, the number of social Web tools becomes significantly lower when it is associated with any use in doctoral activities. In fact, beyond their 'academic life', the surveyed students state to use a range of social software applications, but appear to particularly like web conferencing tools and video sharing sites, along with applications such as forums and mailing lists. Most of them also spend time in 'general purpose' social networking sites (e.g. Facebook). However, there are also signs that they are adopting Web 2.0 tools in their doctoral work, above all to undertake an early exploration of research topics and for information retrieval on defined issues. Solving occasional, practical needs related to the conduct of their research project is stated to constitute the main motivation for uptaking emerging tools. Despite the fact that in very few cases the higher education institution provide them with the opportunity to utilize Web 2.0 applications in their doctoral programs, the PhD students seem to assume a cautious approach to digital facilities in the open Web, in alignment with international studies [30]. In fact, doctoral researchers appear to accurately 'filter' the wide range of tools they daily cope with when they focus on academic activities: their approach is pragmatic rather than pioneering, and there is a tendency to select a small number of efficient, reliable, easy-to-use tools that can make research practices more efficient [27].

However, the opportunities to harness social media to practice academic writing and exercise critical reading seem to be neglected. This can also be interpreted looking at findings related to academic presence in social media. In fact, very few PhD students actually run a blog related to their research activities, and also their presence in Twitter is scant. A slightly more relevant presence can be registered in research-focused social networking sites. On the other hand, it is worth noting that among the clusters of academic activities being undertaken by these early career researchers, the option of the construction of an academic identity (or 'personal branding') is judged as 'not applicable' by a great majority of respondents. In fact, the issue of academic identity that often is seen as crucial for enabling a future career as academics, seems to generally be overlooked in the sampled PhD students.

Finally, some interesting issues arise from the relationships between the reported drivers and inhibitors in the adoption of new tools and environments and the indicated potential advantages of the social Web for the broad areas of activities in the research work. Like the well-established academics [32], the PhD researchers need to gain understandings of some real advantages before uptaking new tools for inquiry purposes: thus, cultivating awareness becomes a key issue.

6 CONCLUSIONS AND FUTURE RESEARCH

This paper reported a selection of early findings related to an online survey carried out across three Italian universities and addressing doctoral researchers' environmental conditions and ICTs uptake. The survey aimed to draw descriptors of the "ecology of resources" [1], understood as 'potential forms of assistance' supporting doctoral students in their learning trajectory. This article particularly focused on the actual adoption of Web 2.0 tools and on the place they are likely to occupy in the lived experience of a sample of PhD researchers, situated within a formal research training context.

It can be said that the Web 2.0 does not affect yet the research workflow of most doctoral students being surveyed, unlike elsewhere proven on an international sample of early career and well-established researchers [29]. On the contrary, the use of a relatively small number of Web 2.0 tools results as emergent and especially focused on facilitating communication and widening content sharing and searching. However, the orientations expressed by the survey participants towards the perspectives of the social Web for research activities indicate a clear expectation about a still unexploited potential of these tools. As a whole, the PhD students seem to adopt Web 2.0 as an expanding repository of content and resources rather than a space to practice networking. Indeed networking still completely relies on traditional channels such as conferences and seminars, whilst the networks personally curated on the open web have just started to play a role in the doctoral journey. However, moving to the opinions about the potential of the social web for doctoral work, it can be drawn that there is a generally high expectation on all the indicated areas of activity (from project management to personal development), while the opportunity to access up-to-date publications is most valued by these prospective researchers. These tentative uses and the uncertainty about clear-cut perspectives of future utilization of such applications is to be related to the importance attributed to a specific research training needed to better understand how to reap the benefits of new tools in the open web. For now it seems that current doctoral students have a generally frequent access to social media in their everyday life, but are self-limiting their adoption in doctoral activities, lacking conventions or early directions about that in their local research context. This general attitude can be also related to the prevalent 'isolated mode' of study/work being adopted by the PhD students, who seem to mainly rely on the local context and on the planned interactions with supervisors, invited experts and peers. In other words, the current adoption of Web 2.0 tools generally seem to fairly well fit the needs of a doctoral journey in which the relationship apprentice/supervisor remains the most influent form of the apprenticeship.

However, this preliminary presentation of data can only return a general idea of the components of individual PhD researchers' learning ecologies, but not of their dynamics in terms of spatial and temporal dimensions. An in-depth analysis (including open answers) is needed in order to reveal the actual interactions among the resources (e.g. spaces, types of support, learning partners) which doctoral students cope with, as arising from the questionnaire. Moreover, a subsequent interviewing process is planned to be undertaken, in order to identify individual champions of Web 2.0 learning ecologies who can be considered as pioneering case studies.

REFERENCES

- [1] Luckin, R. (2010). *Re-designing learning contexts: technology-rich, learner-centered ecologies*. London, UK: Routledge.
- [2] Anderson, P. (2007). What is web 2.0? Ideas, technologies and implications for education. JISC – Technology & Standard Watch. Retrieved from: <http://www.jisc.ac.uk/publications/publications/twweb2.aspx>
- [3] Boulos, M. & Wheeler, S. (2007). The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal*, 24(1), 2–23.
- [4] Elhers, D.-U. (2010). Innovation and Quality for New Learning Cultures. In Elhers, U. & Schenkenberg, D. (Eds.). (2010). *Changing Cultures in Higher Education*. Heidelberg: Springer, pp. 417 – 432.
- [5] Weller, M. (2011). *The Digital Scholar: How Technology Is Transforming Scholarly Practice*. London: Bloomsbury Academic [open access version]. Retrieved from:

http://www.bloomsburyacademic.com/view/DigitalScholar_9781849666275/book-ba-9781849666275.xml

- [6] Bonderup-Dohn, N. (2009). Web 2.0-Mediated Competence – Implicit Educational Demands on Learners. *Electronic journal of e-Learning (EJEL)*, 7 (2). Retrieved from: <http://www.ejel.org/volume7/issue2>
- [7] Veletsianos, G. & Kimmons, R. (2012). Networked Participatory Scholarship: Emergent Techno-cultural pressures Towards Open and Digital Scholarship in Online Networks. *Computers & Education*, 58(2), 766-774. Draft paper retrieved from: <http://www.veletsianos.com/2011/11/06/networked-participatory-scholarship/>
- [8] Hicks, A. & Graber, A. (2010). Shifting paradigms: teaching, learning and Web 2.0. *Reference Services Review*, 38 (4), pp. 621 – 633.
- [9] Dabbagh, N. & Kitsantas, A. (2012). Personal learning environments, social media, and self-regulated learning: a natural formula for connecting formal and informal learning. *The Internet and Higher Education*, 15(1). 3-8 (January 2012).
- [10] Andrews, R. L. & Haythornthwaite, C. (2011). *E-learning. Theory and Practice*. London: SAGE
- [11] Bullen, M. & Morgan, T. (2011). Digital Learners Not Digital Natives. *La Cuestion Universitaria*, 7, 2011, 68-68. Retrieved from: http://www.lacuestionuniversitaria.upm.es/web/articulo.php?id_articulo=84
- [12] Jones, C. & Shao, B. (2011). The net generation and digital natives: implications for higher education. York, UK: Higher Education Academy. Retrieved from: <http://oro.open.ac.uk/30014/>
- [13] Harley, D., Acord, S. K., Earl-Novell, S., Lawrence, S., & King, C. Judson (2010). *Assessing the Future Landscape of Scholarly Communication: An Exploration of Faculty Values and Needs in Seven Disciplines*, UC Berkeley: Center for Studies in Higher Education. Retrieved July 15, 2010 from: <http://escholarship.org/uc/item/15x7385g>
- [14] Procter R., Williams R. & Stewart J. (2010). «If You Build It, Will They Come?» How Researchers Perceive and Use Web 2.0, *Research Information Network*. Retrieved February 20, 2011 from: http://www.rin.ac.uk/system/files/attachments/web_2.0_screen.pdf
- [15] Ellis, R. & Goodyear, P. (2009). *Students' Experiences of e-learning in Higher Education: The Ecology of Sustainable Education*. London: Routledge.
- [16] Barron, B. (2006). Interest and self-sustained learning as catalysts of development: A learning ecologies perspective. *Human Development*, 49, 193-224 (p. 198).
- [17] McAlpine, L. & Amundsen, C. (2011a). Making Meaning of Diverse Experiences: Constructing an Identity Through Time. In McAlpine, L. & Amundsen, C. (Eds) (2011). *Doctoral Education: Research-based Strategies for Doctoral Students, Supervisors and Administrators*. Netherlands: Springer, pp 173-183.
- [18] Kalb, H., Bukvova H. & Schoop, E. (2009). *The Digital Researcher: Exploring the Use of Social Software in the Research Process*. Sprouts: Working Papers on Information Systems, 9(34). <http://sprouts.aisnet.org/9-34>.
- [19] Gardner, S. K. (2009). *The Development of Doctoral Students: Phases of Challenge and Support*. ASHE Higher Education Report, 34(6), 1-14.
- [20] Coverdale (2012). *Social media practices: benefits and risks for doctoral researchers*. Paper presented at the SRHE 2012 Conference, 4-5 December 2012. Available from: <http://www.srhe.ac.uk/conference2012/abstracts/0130.pdf>
- [21] Andrews, R. L., Borg, E., Davis, S. N., Domingo, M. & England, J. (2012). *SAGE Handbook of Digital Dissertations and Theses*. SAGE.
- [22] Haythornthwaite, C. (2009). *Learning in the age of web 2.0*. Public Lectures on the theme of *Learning Networks*. London Knowledge Lab, London, UK. December 1, 2009.
- [23] Millan, N. & Bromage, A. (2011). An initial approach to the integration of Web 2.0 technologies in the research environment. *Interactive Technology and Smart Education*, 8 (3), 148-160.

- [24] Coverdale, A. (2011). Negotiating Doctoral Practices and Academic Identities through the Adoption and Use of Social and Participative Media. Paper presented at ECEL 2011, Brighton, 10-11 November 2011.
- [25] Heinze, N., Joubert, M. & Gilet, D. (2010). Connecting Early Career Researchers: Investigating the Needs of Ph.D. Candidates in TEL Working with Web 2.0. In Proceedings of the 2nd International Workshop on Research 2.0. At the 5th European Conference on Technology Enhanced Learning: Sustaining TEL. Barcelona, Spain, September 28, 2010, CEUR-WS.org/675, 86-92. Retrieved December 30, 2011 from: <http://ceur-ws.org/Vol-675/>
- [26] Zaman, M. (2010). Doctoral Programs in the Age of Research 2.0. In Anandarajan, M & Anandarajan, A. (2010). e-Research Collaboration. Springer Verlag, 233-246.
- [27] Meyer, K. A. (2010). A comparison of Web 2.0 tools in a doctoral course. Internet and Higher Education, 13, pp. 226-232.
- [28] Kraker, P. & Lindstaedt, S. (2011). Research Practices on the Web in the Field of Technology Enhanced Learning. Proceedings of the ACM WebSci'11 [online], June 14-17 2011, Koblenz, Germany, pp. 1-3. Retrieved from: <http://journal.webscience.org/521/>
- [29] CIBER (2011). Social media and Research Workflow, London: University of College. Retrieved from: <http://www.ucl.ac.uk/infostudies/research/ciber/social-media-report.pdf>
- [30] British Library/JISC (2011). Researchers of tomorrow. A three years (BL/JISC) study tracking the research behavior of 'Generation Y' doctoral students. Second annual report 2010-2011. Retrieved June 30, 2011 from: <http://www.jisc.ac.uk/news/stories/2011/06/researchersoftomorrow.aspx>
- [31] James, L., Norman, J., De Baets, A.-S., Burchell-Hughes, I., Burchmore, H., Philips, A., Sheppard, D., Wilks, L. & Wolffe, J. (2009). The lives and technologies of early career researchers, JISC report. Retrieved from: <http://www.jisc.ac.uk/publications/reports/2009/earlycareerresearchersstudy.aspx#downloads>
- [32] Procter R., Williams R. & Stewart J. (2010). *'If You Build It, Will They Come?'* How Researchers Perceive and Use Web 2.0, Research Information Network. Retrieved from: http://www.rin.ac.uk/system/files/attachments/web_2.0_screen.pdf
- [33] Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: Free Press.
- [34] Esposito, A. (2013). The Impact of Social Media on Scholarly Practices in Higher Education: Online Engagement and ICTs Appropriation in Senior, Young and Doctoral Researchers. Book chapter in Patrut, B., Patrut, M. & Cmeciu, C. (2013). Social Media and the New Academic Environment: Pedagogical Challenges, IGI Global Group, pp. 342-367.
- [35] De Vaus, D. A. (2002). *Surveys in Social Research*. (5th edition). London: Routledge
- [36] Cohen, L., Manion, L. & Morrison, K. (Eds.) (2007). *Research Methods in Education*, London: Routledge.
- [37] Larsson, S. (2009). A pluralist view of generalization in qualitative research. *International Journal of Research & Methods in Education*, 32(1), 25-38.
- [38] LSE Public Policy Group (2011). *Maximising the impacts of your research: an handbook for social scientists*. London School of Economics.
- [39] Czaja & Blair (2005). Stage of a survey. In *Designing Surveys: A Guide to decision and procedures*. Pine Forge Press, pp. 11-32.