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Sharing Resources in Open Educational Communities

Paolo Tosato¹; Beatriz Carramolino Arranz² & Bartolomé Rubia Avi²

1) Department of Philosophy and Cultural Heritage, Ca' Foscari University of Venice, Italy

2) Department of Pedagogy, University of Valladolid, Spain

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Sharing Resources in Open Educational Communities

Paolo Tosato
Ca' Foscari University of Venice

Beatriz Carramolino Arranz
University of Valladolid

Bartolomé Rubia Avi
University of Valladolid

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Abstract

The spread of Internet and the latest Web developments have promoted the relationships between teachers, learners and institutions, as well as the creation and sharing of new Open Educational Resources (OERs). Despite this fact, many projects and research efforts paid more attention to content distribution focusing on their format and description, omitting the relationship between these materials and online communities of teachers.

In this article we emphasize the importance of sharing resources in open educational communities (OEC), analysing the role of OERs and OEC in teachers' lifelong learning. Investigating their current usage, we aim to discover whether their interweavings could be an effective approach to support sharing of resources among teachers and to promote new educational practices.

Through two surveys which involved more than 300 teachers from across Europe it was possible to highlight that is not simple to stimulate the collaboration among teachers, both online and face to face; nevertheless, when this happens, it seems to be a good way to promote formal and informal learning for teachers, as well as innovation in their professional practices.

Keywords: Open Educational Communities, Open Educational Resources, sharing, collaboration, lifelong learning

Compartiendo Recursos en Comunidades Educativas Abiertas

Paolo Tosato
Ca' Foscari University of Venice

Beatriz Carramolino Arranz
University of Valladolid

Bartolomé Rubia Avi
University of Valladolid

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Resumen

La difusión de Internet y los últimos desarrollos Web han potenciado los vínculos entre profesores, estudiantes e instituciones, así como la creación y compartición de nuevos Recursos Educativos Abiertos (REAs). A pesar de ello, muchos proyectos y esfuerzos de investigación han prestado especial atención a la distribución del contenido, centrándose en su formato y descripción, si tener en cuenta las relaciones entre estos materiales y las comunidades de profesores online.

Este artículo enfatiza la importancia de compartir recursos en Comunidades Educativas Abiertas (CEAs), analizando del rol de los REAs y de las CEAs en la formación permanente del profesorado. Investigando el uso actual de ambos, nos planteamos descubrir si su interconexión permite generar una aproximación adecuada para apoyar la compartición de recursos entre profesores y para promover nuevas prácticas educativas.

A través de dos encuestas, en las que participaron más de 300 personas de procedencia europea, ha sido posible resaltar la dificultad de estimular la colaboración entre profesores, ya sea de forma presencial u online. En cualquier caso, cuando existe colaboración, parece ser una forma eficaz de promover el aprendizaje formal e informal de los profesores y la innovación en sus prácticas profesionales.

Palabras clave: Comunidades Educativas Abiertas, Recursos Educativos Abiertos, compartir, colaboración, aprendizaje a lo largo de la vida

Nowadays emergent open educational phenomena are taking place and evolving day by day, promoting the democratization of education. Phenomena like the Massive Open Online Courses (in their several presence forms) (Siemens, 2013) and the Semantic Web based Services (Fensel et al., 2011), such as automatic content aggregators based on users' personalization, are facilitating the creation and sharing of new open educational resources (OERs) (Atkins et al., 2007) and open educational practices (OEP), i.e., the possibility to freely use educational resources in open learning environments (OPAL, 2011).

The spread of resources (specially OERs), as well as the diffusion of the Internet and the latest Web developments, leads to a new concept of society, the *knowledge society*, where knowledge is like a shared resource to which everyone can access and feed with the new technologies. In particular the changes introduced by Web 2.0, which is transforming the Web from a unidirectional publishing space (Web 1.0) into a network of platforms, are enabling collaborative content creation and participation in social networks (Dohn, 2009; Greenhow et al., 2009). In this scenario we can imagine the use/re-use of OERs in a range of formal, non-formal and informal learning contexts. There, the processes of reusing and revising a resource should be “key strategies” to develop creativity, as well as to use the same content in a multitude of different ways, for instance taking into account different learning styles; social software and group structures in web-based communities could work as an amplifier for this process (Tosato & Bodi, 2011).

Unfortunately, as several researchers remind us (e.g. Dillenbourg, 2000; Kearsley, 1998; Moore 1993; Velleman & Moore 1996; Watson & Downes 2000), it has been typical throughout the history of educational technology to have over-optimistic expectations about new technical innovations. Although the number of repositories of digital resources has been constantly increasing during the last twenty years, as underlined by ROAR¹ and OpenDOAR², there are no sound results about how this growing number of open and freely accessible content hubs impacts on teaching and learning quality as well as on teachers' professional practices (UNESCO, 2012; European Commission, 2012).

Most of the projects which produce OERs are publishing projects (Downes, 2007). The provision of resources is coming out from commercial publishing houses, universities or foundations; only a small part is produced

by teachers themselves, who seem to remain passive users of these archives (for instance, this is what has occurred with portals such as MACE³, Share.TEC⁴ and OpenScout⁵, among others; these portals have emerged from projects funded by the European Commission). Despite the development of a portal to access educational resources is an important result of these projects, it is possible to detect an inefficient effort on engaging teachers' communities⁶. This lack of teachers' involvement prevented from turning these portals into resources able to influence teachers' practices and promote quality in education (OPAL, 2012).

Moreover, still OERs mostly address higher education (McCormick, 2003), often aiming to reduce the access cost to university materials (COL-UNESCO, 2011), with a lack of attention to Primary and Secondary Schools, as highlighted also by Richter & Ehlers (2010). These facts emphasize a challenge for the next years to make use of OER in K-12 schooling. In this context it is possible to see a gap between educational research and the practice of teachers in classrooms.

Therefore, it is necessary to develop systems which could tackle users' personal needs, allowing teachers to personalize the way they interact with the system itself and their peer (Carramolino & Rubia, 2013). To do this, it is important to take into account the newest Web developments, such as semantic Web services (automatically content correction, personalization services of knowledge retrieval, and so on) and social Web tools, in order to create a collaborative environment⁷ that is able to promote communication and construction of meaning and knowledge among teachers.

Research Problems

As highlighted by the Open Educational Quality Initiative, many research efforts focused on problems concerning resources access, neglecting how these materials could support the educational practices and promote quality and innovation in teaching and learning (OPAL, 2012).

According to this, we set out if sharing use experiences of open educational resources within a group of teachers could support an efficient use of OERs and enable new innovation processes and teachers' professional growth. Is it possible to adopt an approach which will include active teachers' participation, instead of being based on a simple

transmission of contents from repository to users? How should this participation take place?

Through two teacher surveys, we want to analyse in this paper the role of OERs and open educational communities (OEC) in teachers' lifelong learning, and to investigate their current usage. Our aim is to discover whether their interweaving could be a positive approach to support sharing of resources among teachers and to promote new educational practices.

High quantity and quality of contents, multimedia objects, systems for exchanging open resources, etc., are necessary but not sufficient conditions to generate a change in education towards the real ICT inclusion in practices with an expected impact in teacher professional development, as well as in new school practices. By means of providing abstract contents described by simple attributes and publishing them in online repositories, we cannot expect an active involvement of users. Differently, it is necessary a social construction view of knowledge (Wiley et al., 2003; Marconato, 2009). In a constantly changing world *"real-world information is not held inside silos like academic institutions pretend"* (Robin Good, 2012), but it is distributed throughout end-user-producer communities; therefore, it will be ever more important to advise teachers to leverage networks and collaborate in communities of practice (CoPs) (COL-UNESCO, 2011).

In the next section we analyze more deeply the importance of sharing resources in open educational communities, defining what we mean by "OEC". Afterwards, we report the results of two surveys to investigate the current usage of OERs and OEC in teachers' lifelong learning, to find out whether they can promote an efficient use of resources among teachers and teacher educators. Finally, the data reported are discussed in conclusion section.

OER and Collaborative Environments

As mentioned above many projects and inquiries focused on OERs are paying more attention on their distribution, trying to describe every object in the best way to provide fast resource retrieval, forgetting that OERs are just one aspect of a major paradigm shift in education which cannot be seen isolated. It is intimately linked to connectivism and collaborative learning, as well as with digital literacy, open access and lifelong learning (Creelman

& Ossiannilsson, 2011). In particular, the concept of OER has its foundation and base in the connectivist theory, according to which:

Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to individual. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed. (Siemens, 2004)

There are research evidences which have identified the potential of communities of practice and professional learning networks in teacher professional development for building ICT integration capability (Midoro, 2003; Bocconi et al., 2003), as well as the importance of participating in collaborative networks to be able to improve the pedagogical methods required by the digital age. Therefore, it is vitally important to establish a relationship between OER and collaborative environments, as sustained by recent developments (Wilson, 2011), which try to associate social networking tools to encourage collaboration with OERs. Also Sampson (2010) outlines a range of challenges in learning objects repositories (LORs), highlighting the importance of promoting collaboration.

Hence, in a Web 2.0 environment, an educational resource does not have to be only well designed to be really useful. It is also important that the resource may represent a pretext for establishing a relationship between the user and the context (the learning environment) and to promote an active interaction among those teachers who are using it (De Waal, 2007). The value of an educational resource does not lie only on itself but also in the process of reflection, communication and knowledge construction teachers create around it.

A large number of available resources is, for sure, a feature that can attract users inside a community; however our hypothesis is that the most interesting aspect of a repository of OERs and, in particular, of communities that deal with the design, use and reuse of OERs, are people interacting, using and contributing into the system. There are users who communicate with each other so that the Web has even an emotional aspect which cannot be ignored.

Web 2.0 tools can play an important role in building online communities by taking into account this emotional aspect and they can be useful for motivating and supporting online collaboration between teachers (Blaschke & Kurtz, 2010). In these online communities, teachers work together to share information, build new knowledge, and establish social networks (Harasim et al., 1995). For this reason, communities of practice⁸, professional learning communities (PLCs)⁹ and, recently, social networks¹⁰ have been proposed as a new approach to teach, since they are able to reduce the teacher's isolation (Lortie, 1975), to encourage professional growth (Looi et al., 2008), and to transform teachers' practice (Lieberman & Pointer Mace, 2010).

Therefore, the main question we reflect on is: why do we have to keep on providing environments and repositories rich of resources, paying particular attention to the relation between users and artefacts, instead of the relationships among users? Do we really believe that by facilitating the interaction with contents we will be able to sustain collaboration and innovation in an educational approach? If a place exists in relation with specific CoPs (Lave & Wenger, 1991), i.e., shared practices among members of a particular social group, the designer of a learning system has to keep in mind and promote the qualification of social activities which happen inside the learning spaces. Maybe, it will be more important to sustain the creation of networks among users, rich of sharing posts, comments and materials, than providing the shape of the platforms, which are like a white canvas, painted by their participants.

Downes states that "*communications are exchanges of content between the participants*" (Downes, 2013, p. 220). If this is true, by sustaining the interaction among users we will be able to sustain the creation of new contents, enriching the system with new resources. From this point of view, we can see a repository like the consequence of a network, the sedimentation of ideas and concepts exchanged in a community.

For this reason, in this paper, we hold that it is important to share resources in open educational communities (OEC). We understand Open Educational Communities (keeping in mind the definition of OER¹¹) like the open provision of a community of users, which is supported by information and communication technologies for creating, sharing, commenting, analysing and adapting educational practices and resources, and where formal, non-formal and informal learning may occur.

In this case the term "open" not only means free access to resources, teaching activities and tutoring, but also refers allowing one user to change or influence another user, generating new ideas, distributing knowledge from member to member, fostering collaboration, etc. According to Wenger (1998), if teachers have enough common ground to reciprocally engage themselves and a good dose of diversity which could lead them to a richer learning experience, then they could find interesting relationships with other peers.

What makes the community "educational" is the context of community itself, the experiences and best practices shared by users. The result of this process of participation which involves the whole community are digital objects, that we can define as "educational" thanks to the information that surrounds a resource, emphasizing its use in a particular learning context (De Waal, 2007).

Community's Impact in Sharing Resources

To better investigate the relation between communities of practice and repositories, we carried out two studies. Our aim was to confirm whether it is possible to promote an efficient use of resources among teachers and teacher educators, and improve their didactic methodology by supporting collaboration and sharing of best practices in communities of teachers.

Sample

As mentioned above, our research is based on two different studies. The first one refers to a survey applied in the Context of a European Project, Share.TEC (2008-2011), where authors of this article participated. The project aimed to create a digital portal for accessing, retrieving and reusing Teacher Education Resources across Europe (Carramolino & Rubia Avi, 2013). Among the activities of the project we had to collect and analyse data in order to improve the portal. In this article we have selected one of the surveys which was applied to potential users of the system, as it has direct relation with the research question we have set out. The selection of participants was made by convenience sampling (most of teachers were persons we knew personally), spreading the survey to teachers and teacher educators from the national contexts the members of the project belonged to

(for this reason the survey was translated into different languages: Italian, Spanish and Swedish, trying to involve people by means of face to face, e-mail and social networks). The survey was answered by 204 people from 3 countries (Italy, 80,00%; Spain, 12,00%; and Sweden, 8,00%). On average, the respondents were 42 years old and the majority were women (83,00%).

The second survey was applied inside an Italian research, independent from the Share.TEC project, where one of the authors participated. The aim of this research was to investigate the relation between community of teachers and educational resources, in particular whether supporting community of teachers and the sharing of material best practices, it was possible to promote an efficient use of resources and improve teachers' didactic (Tosato, 2013). Along the research data collection phrase two surveys were submitted to Italian Secondary School teachers. Data were collected during the months of November and December 2012. In this paper we selected one of the surveys, the one whose data were comparable with those collected in the Share.TEC project. The selection of participants was made by convenience sampling (most of teachers were persons we knew personally), spreading the survey to teachers working in the north-east regions of Italy (trying to involve people by means of face to face, e-mail and social networks). The survey was answered by 92 Italian teachers. On average, the teachers were 48 years old and the majority were women (77,17%).

The method adopted to submit both surveys consisted of a first information moment, about the aim of the research and of a short anonymous online questionnaire, composed mainly by closed questions.

Data reported in this section are not intended to be a predictor, neither of teachers' behaviour in social networking nor of their sharing of digital practices. Rather, we introduce these data because they might be useful to explore the topic of open educational communities and the difficulties which entail the creation of an environment able to make possible the sharing of experiences/knowledge and the establishment of collaboration to produce and review new materials. Furthermore, given the large sample size and its diversity, and in particular the high number of Italian people among them, results reported in this article refer to this specific sample, hence it is not possible to generalize them to all the teachers' domain at European level; this generalization would require the investigation of many other factors and contexts.

Share.TEC Survey: Social Networking and Digital Resources

The questionnaire was organized in four sections: the first one inquiries about users' personal data, in particular their professional context; the second one deals with the way teachers use and search online resources; the third section refers to social networking (whether teachers use social network tools and whether they collaborate in CoP); and the fourth section relates to the features they would like the system hold to recommend them, resources or persons. As the results obtained from sections two and three are the most interesting for this paper topic, we will focus on them.

The second part of this questionnaire, related to how teachers use and search online resources, underlined a lack of use of institutional repositories. In fact, data collected through the multiple choice question "What type of Web tools do you use when searching in Internet?"¹², showed that teachers prefer to use Google tools or Web 2.0 services (Wiki, Blog, YouTube, Delicious, Social Network) to search resources, and only few of them were using specialized repositories of open educational resources: 40 users (19.61%) were using institutional repositories (e.g. archives that are not connected with universities), 55 (26.96%) were using universities repositories and only 3 (1.47%) were using MERLOT (see Figure 1). These results put in evidence the impact that repositories (specialized in resources for a particular context) have in users, how much these repositories are known by teachers or teacher educators and how much they satisfy their needs. It is clear that up to now an overwhelming majority of teachers continues to use general search engines (197 users – 96.57%), like Google, for searching their resources.

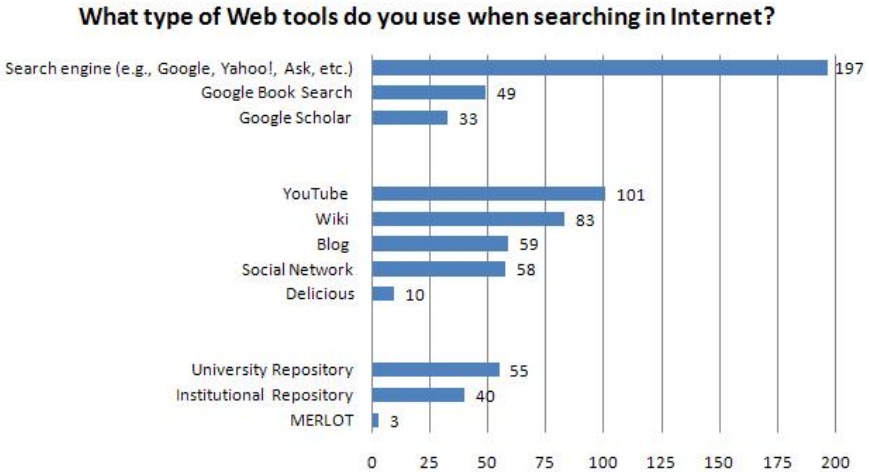


Figure 1. Tools used by users to search resources online. Graph drawn on the basis of data collected by question 5 in "Share.TEC - social networking/recommender" survey (<http://www.univirtual.eu/limesurvey/index.php?sid=78165&lang=en>).

Data suggests the difficulty of creating a community of practice around these specialized repositories. In addition, without a collaborative environment able to involve a significant number of users, it might be difficult to stimulate the sharing and creation of new resources, as well as the improvement of teachers’ practices.

The third part of the survey, related to social networking, highlighted some difficulties to create a community of teachers. To the questions “Do you use Facebook or any other social network (LinkedIn, Plaxo, Xing)?” and “Do you know what a ‘Community of Practice’ is?” users who answered positively were respectively 45.59% and 52.45% (see Table 1). In particular, investigating more deeply the answers from those users who declared to know what a community of practice is (107 users), only 30.39% of them declared to be a member of a community of practice, and only 28.92% declared to be nowadays a member of a community of teachers at national or international level. It could have been possible they did not

know what a community of practice was, as it is a theoretical concept which was not explained in the survey.

Table 1
*Knowledge about communities of users*¹³

	YES	NO	I don't know
Do you use Facebook or any other social network (LinkedIn, Plaxo, Xing)?	45.59% (93)	51.47% (105)	2.94% (6)
Do you know what a 'Community of Practice' is?	52.45% (107)	43.63% (89)	3.92% (8)

In contrast with this lack of use of collaborative environments, which deserves to be investigated deeply, there is a general desire to be part of an online community of peers, based on the exchange of resources and comments (as reported in Table 2, a limitation of this research is that we did not investigate whether respondents were aware about the differences between Community of peers and Community of practice). In fact, 85.78% answered positively to the question “Would you like to work online with a colleague to solve a problem that afflicts you?”, and 87.75% answered positively to the question “Would you like your teacher network to be based on the exchange of resources and comments?” (see Table 2).

Table 2
*Desire to be part of an online community of peers*¹⁴

	YES	NO	I don't know
Would you like to work online with a colleague to solve a problem that afflicts you?	85.78% (175)	9.80% (20)	4.41% (9)
Would you like your teacher network to be based on the exchange of resources and comments?	87.75% (179)	6.86% (14)	5.39% (11)

In any case, despite this desire of sharing resources and experiences, when we asked users why they used Web 2.0 tools and why they were members of community of practice, the most common reason was “for

finding information”, while they did not explain in their answers the idea of sharing. In fact, referring to the question “What type of Web tools do you use when searching in Internet?”, we asked teachers “Why do you use these Web tools? What are the features that you find the most useful?”¹⁵. The 93.14% of the users declared that the principal reason behind their choice was that they could find information and data in a simple and quick way (so the effective usability of tools such as Google can be a relevant issue for selecting this kind of search engines to find resources or information). This result seems to be linked to the findings gathered by Weisberger, as cited in ([Educational-portal blog, 2010](#)), showing that only 10-12% of professors using social media use them for active purposes, such as learner-generated content creation, but most of them use it to find information.

Italian teacher survey: teachers' community and educational resources

This second questionnaire, which involved only Italian teachers, was organized in the following four sections: professional environment, operational processes and interaction tools (to investigate the tools used by the teachers to exchange digital contents and their practices), teacher perspectives (whether to participate in a teachers' community supports resources and experience sharing), and professional growth process (whether to share didactic experiences in a teachers' community supports didactic innovation processes and professional growth). The analysis reported below refers mainly to the sections two and three.

The second part of the survey, related to operational processes and interaction tools, highlighted the difficulties that teachers meet while they collaborate in communities of practice, confirming what we observed in the Share.TEC survey. Despite a general willingness to cooperate and share materials inside a group of peers, only 33,70% of the users are members of a community (percentage quite similar to the Share.TEC survey: 30,39%). A deeper analysis of data collected pointed out that the majority of teachers who participate in a community are members of a group where interactions happen both online and face to face (61,29% respect to the community-participating teachers), and only 9,68% of teachers are members of a group where collaboration happens totally online (see Figure 2).

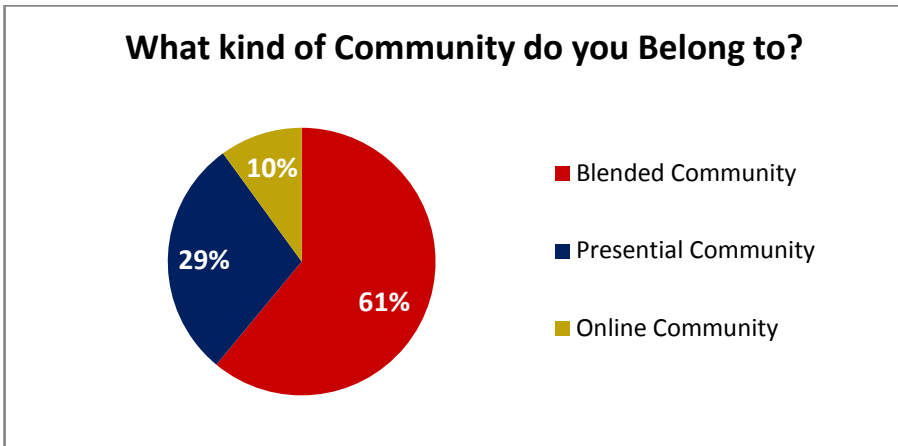


Figure 2. "What kind of community are you member?" Graph drawn on the basis of data collected by question Q13 in "Communities of teachers, didactic experiences and repositories of digital resources" survey (<http://www.projectscool.it/survey/index.php/survey/index/sid/615945/newtest/Y/lang/it>)

The majority of teachers who answered the questionnaire are members of a community which integrates teachers of institutions from the same region (51,61%) or a group of teachers who work inside the same school (29,03%). Only 9,68% of teachers are members of a national or international community. These data underline how important is for teachers to arrange face to face, which are useful to strengthen the community and to enrol new members.

Investigating more deeply the characteristics of these communities, 19,35% of teachers who belong to a community state that they do not use online platforms to collaborate or share materials. These data testify the great use of electronic mails to share materials (85,45% of teachers use e-mails to share resources online). This aspect might have relation with the enormous potential for experimentation in school, where it is possible to introduce new tools to help the communication among users, but also points out how communities of teachers remain hidden reservoirs of resources and experiences, so that it would be possible to share resources and practices in a more efficient way and with a greater impact on professional practices if they would use OEC.

Moreover, in accordance to both studies addressed in this paper (the Share.TEC survey and the Italian teachers' questionnaire), teachers state to prefer a search engine like Google to look for online resources.

However, it is interesting to note that users who are members of a community are more likely to use blog and community itself to search materials (see Table 3). In the Italian survey, the community seems to act as a support to teachers for sharing educational materials: 77,42% of teachers who are members of a community share digital materials online, compared to 50,82% of users that are not members of a community (see Figure 3).

Table 3

*What kind of tools do you use to search resources online?*¹⁶

	Teachers member of a community		Teachers that are not member of a community	
	N°	%	N°	%
Search engine like Google	30	96,77%	61	100,00%
Online repositories that you know	12	38,71%	26	42,62%
Tools offered by your community	10	32,26%	4	6,56%
Forum	3	9,68%	7	11,48%
Blog	5	16,13%	4	6,56%
Wiki	6	19,35%	12	19,67%
Social network	2	6,45%	6	9,84%
Other	0	0,00%	0	0,00%

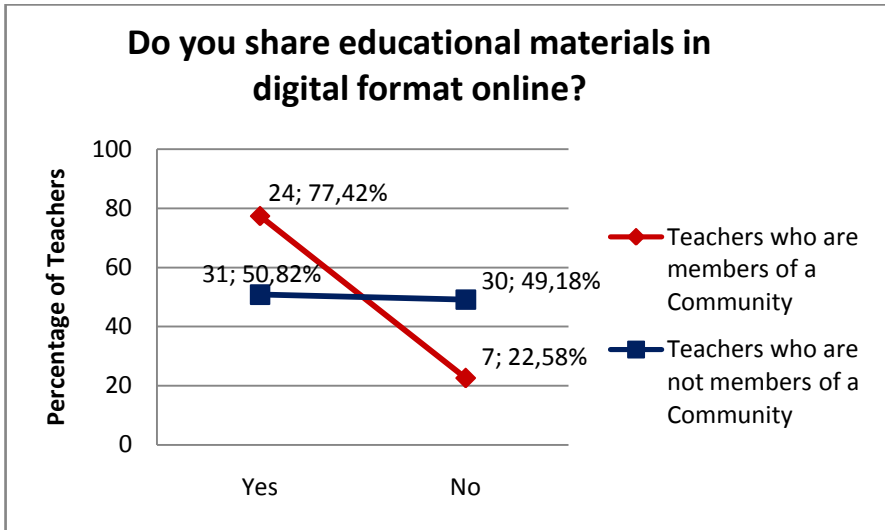


Figure 3. "Do you share educational materials in digital form online?". Graph drawn on the basis of data collected by question Q19 in "Communities of teachers, didactic experiences and repositories of digital resources" survey (<http://www.projectscool.it/survey/index.php/survey/index/sid/615945/newtest/Y/lang/it>)

To better understand the impact of a community in sharing resources, in the third part of the Italian survey (related to teacher perspectives: whether to participate in a teachers' community supports resources and experiences sharing), community-participant teachers (31 teachers) were asked whether the exchange of materials is facilitated and stimulated by their group of peers. Positive answers were 90,32% (28 users) and negative answers 9,68% (3 users). This aspect was investigated in deep by asking the reason why the community is so important for them. 53,57% of the users underlined the importance of sharing with other teachers, i.e., users with the same interests. The 50,00% of the users state that the community is a useful place where you can ask how to use resources, and 32,14% highlighted how into a community it is possible to find not only materials, but also a description of the learning experience in which the resources were used/created. The majority of users that are members of teachers' communities, also made clear the usefulness of the community to create

new educational resources and to reuse materials (26 users out of 30, 83,87%); this is especially true if the group membership is similar to a "hoppy website"¹⁷, i.e., a community in which there is always someone available to trust, someone to ask for a help; a kind of instant-on, workplace chat room.

Conclusions

On the basis of these data, stimulating collaboration among teachers, both online and face to face, does not seem to be simple, and in particular we cannot expect it to happen spontaneously (Olimpo, 2010). Furthermore, in some cases, it seems that teachers are still reluctant to adopt ICT to share resources and knowledge, such as collaborative environments. In this context it is clear that OERs might not be enough for innovating teachers' professional practices. Teachers might accept cooperation with other teachers and change their attitudes towards the use/sharing of educational practice and resources. To underline this apparent teachers' reluctance to adopt ICT and the innovation they bring, Belland used the sociological concept of *habitus* (Belland, 2009).

To better understand and tackle these problems, it is important to take into account the age and the training of our teachers. If we consider that the average age of the aforementioned survey participants, 42 years old in the Share.TEC survey, and 48 years old for the Italian survey, we are not speaking about digital natives¹⁸, but about teachers who were trained when ICT was either not present or viewed as a tool to solve specific problems, not as something that deeply changes the learning process. This entails that teachers' understandings of how education is practiced are difficult to change in few years, especially if the teachers' training programs still considers ICT like a merely technical tool which is not integrated in the learning process. Unless teacher education programs change the way of developing digital and collaboration competences as an essential life and career competence, it will be unlikely that teachers will change their habits and also that they embrace new approaches to teaching (Albion et al., 2011).

Despite the Web seems to be a good training environment to develop the digital competences, we cannot hope that this process happens by a spontaneous use of the Web; it is necessary to design and implement

specific learning situations based on OERs and Open Communities of Practice.

The creation of environments for promoting the collaboration and exchange of best practices and resources among teachers seems to be a good way to promote formal and informal learning. In particular, these environments have to be open educational communities, in which OERs are far from being published materials created by academics and merely consumed by repository users. Furthermore, while the number of cooperative activities in a network increases, "*personal social networks become the scene of informal exchange of expertise, and 'communities of practice' develop*" (Bessenyei, I., 2007, p.10).

However, even if new platforms and collaborative environments have been implemented to motivate teachers in sharing digital resources and in participating in CoP there is still a suspicion towards ICTs adoption. This means that a lot of efforts are needed. Particularly, in the teachers' training context are required efforts for both change teacher's habits and to increase collaboration in their practice, as emphasized in Horizon 2020 Programme, where ICTs are underlined as key aspect to promote the "*modernization of education and training*", where "*the challenge is to reinvent the education ecosystem and re-empower teachers in the digital age*" (European Commission, 2013a). Moreover, this Programme shows like the use of platforms for open collaboration are "*essential tools for building operational links between science, technology, innovation and society*" (European Commission, 2013b, p.5).

Notes

¹ ROAR - Registry of Open Access Repositories, URL: <http://roar.eprints.org/>

² OpenDOAR - Directory of Open Access Repositories, URL: <http://www.opendoar.org/>

³ MACE - Metadata for Architectural Contents in Europe, portal of architectural resources, URL: <http://mace-project.eu/> (project co-funded by European Commission).

⁴ Share.TEC - Sharing Digital Resources in the Teaching Education Community, portal of educational resources for teacher educators, URL: <http://portal.share-tec.eu/> (project funded under the eContentplus Programme: <http://www.share-tec.eu/>).

⁵ OpenScout - Skill based scouting of open user-generated and community-improved content for management education and training, portal of open educational resources in the area of management education and training, URL: <http://learn.openscout.net/> (project co-funded by the European Commission within the eContentplus Programme: <http://www.openscout.net/>).

⁶ When we talk about online communities of teachers we refer to communities like *Open Science Resources* (<http://www.osrportal.eu/>), *NDLR - National Digital Learning Resources* (<http://www.ndlr.ie/>), *Educat* (<http://www.edu365.cat/>), *LeMill* (<http://lemill.net/>), and so on.

⁷ In this paper we will limit our view to Collaborative Virtual Environments (CVEs) meant for educational practices. With this term we mean "computer-enabled, distributed virtual spaces or places in which people can meet and interact with others, with agents and with virtual objects" (Redfern & Naughton, 2002, p.204).

⁸ "Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. [...] learning can be the reason the community comes together or an incidental outcome of member's interactions." (Wenger, 2012). A community of practice is featured by three characteristics: the domain (it has an identity defined by a shared domain of interest), the community (members engage in joint activities and discussions, help each other, and share information) and the practice (members of a community of practice are practitioners).

⁹ Professional learning communities are communities "in which the teachers in a school and its administrators continuously seek and share learning and then act on what they learn. The goal of their actions is to enhance their effectiveness as professionals so that students benefit." (Hord, 1997). Professional learning communities are featured by these attributes: supportive and shared leadership, collective creativity, shared values and vision, supportive conditions, and shared personal practice.

¹⁰ A social network, also named virtual community, is a "Web-based service which allows individuals to (1) build a public or semi-public profile within a bounded system, (2) to articulate a list of other users with whom they share a connection, and (3) to view and to cross their list of connections and those made by others within the system [...]. What makes social network sites unique is not that they allow individuals to meet strangers, but rather that they enable users to articulate and make visible their social networks." (Boyd & Ellison, 2007). Examples of social networks are: Facebook, LinkedIn, Twitter and YouTube.

¹¹ UNESCO defines OERs like: "The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes." (UNESCO, 2002, p.24).

¹² "What type of Web tools do you use when searching in Internet?" is a multiple choice question with the following options: Search engine (e.g., Google, Yahoo!, Ask, etc.), Library Web site, Online reviews, Online bookseller, Google Scholar, Google Book Search, Windows Live Academic Search, My toolbar/my favorites, Institutional Repository, University Repository, Social Network, Delicious, YouTube, Blog, Wiki, MERLOT, Other.

¹³ Questions 8 and 10 in "Share.TEC - social networking/recommender" survey (<http://www.univirtual.eu/limesurvey/index.php?sid=78165&lang=en>).

¹⁴ Questions 16 and 17 in "Share.TEC - social networking/recommender" survey (<http://www.univirtual.eu/limesurvey/index.php?sid=78165&lang=en>).

¹⁵ "Why do you use these Web tools? What are the features that you find most useful?" is a question with an open answer. Hereafter an excerpt of the users' answers: "allow quick access to a huge amount of information of a particular type (for instance Google Scholar allows a broad search for academic literature)", "quick video and data search", "convenience, speed, low cost, breadth of choice", "possibility to find information, sometimes also well structured, in a rapid and fast way", "possibility to get real-time information", "speed and convenience to find information".

¹⁶ Question Q17 in "Communities of teachers, didactic experiences and repositories of digital resources" survey (<http://www.projectschoool.it/survey/index.php/survey/index/sid/>

615945/newtest/Y/lang/it). We obtained a no-sense value in the item: "Tool offered by the community" for teachers who were not members of a community. They assumed it was referred to social networks instead of a community of practice.

¹⁷ Website created by people really passionate about a hobby, who want to tell the world about it. For instance a person can build a site about cooking, gardening, cycling, his/her favorite music band, and so on. Thanks to this site, the author can make his/her hobby more popular, learn new and interesting facts related to that activity, and attract followers.

¹⁸ In this paper we use the digital native–digital immigrant metaphor just to refer to the age of our users. We are aware that the same author who coined this metaphor, Marc Prensky, reconceptualized the concept, updating it towards “digital wisdom” (Prensky, 2012).

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Paolo Tosato is a researcher in the International Center of Studies for Educational Research and Advanced Training, Department of Philosophy and Cultural Heritage, Ca' Foscari University of Venice, Italy. ORCID id: [0000-0002-3707-7840](https://orcid.org/0000-0002-3707-7840)

Beatriz Carramolino Arranz is Member of the research groups: Intelligent and Cooperative Systems Research Group / Education, Media, Computing and Culture (GSIC-EMIC); and Transdisciplinary Research Center in Education (CETIE). Department of Pedagogy. University of Valladolid, Spain. ORCID id: [0000-0001-6137-5496](https://orcid.org/0000-0001-6137-5496)

Bartolomé Rubia Avi is Member of the research groups: Intelligent and Cooperative Systems Research Group / Education, Media, Computing and Culture (GSIC-EMIC); and Transdisciplinary Research Center in Education (CETIE), where he leads the CETIE Doctorate Program in “Transdisciplinary Research in Education”. Department of Pedagogy. University of Valladolid, Spain. ORCID id: [0000-0002-4963-4552](https://orcid.org/0000-0002-4963-4552)

Contact Address: Paulo Tosato, Via Borgo Padova, 65/6, 31033, Castelfranco Veneto, Treviso, Italy. Email: ptosato@tiscali.it