The Web 2.0 Approach and its Repercussions on E-learning Applications: The Development of a Prototype for Informal Learning

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Abstract

This article presents a new Personal Learning Environment prototype. This prototype constitutes an innovative approach for developing E-Learning systems based on the principles that the widespread diffusion of Web 2.0 applications has recently contributed to emphasize. Among the most prominent features of Web 2.0 is the ability to enhance data creation and exchange. Assuming that exported and exchanged data engender knowledge, it ensues that Web 2.0 is an effective learning management platform.

1 Introduction

1.1 Web 2.0

Web 2.0 (O'Reilly 2005) has brought about a crucial change in contemporary usership. Nowadays users no longer content themselves with the passive role of consumers, but tend to get increasingly involved in active data management as both authors and evaluators, or – to put it otherwise – as active subjects of the digital reality they belong to. Such a change is mainly due to the intrinsic features of the new generation of Digital Native users (from the 1980s onwards), who – unlike Digital Immigrants (Prensky 2001) – have not experienced the Computer Revolution late in their life, but have been born and bred in the digital era. These users are much more demanding than the previous generation is, especially as far as the range of online services is concerned. In effect, Digital Natives' lifestyle is so symbiotic with the Net that they conceive virtual and real lives as complementary; as a consequence, these users need retrieving information as easily and quickly as possible.

Thanks to its serendipitous nature (Mathes 2004) and its massive usage of keywords associated with any single digital datum (Vander Wall 2007), Web 2.0 ceaselessly prompts new approaches to information retrieval or, better, implements and optimizes past theories (Landow 1993). One of the keystone concepts of the new Web is the idea – trivial from the point of view of technology, but meaningful from that of philosophy – of exporting data (or, more generally, contents) created by an author in a specific repository to an entirely new one. Thus, the contents encoded by a hypothetical user α in an application A can be used by a user β within an application B programmed for decoding the contents of the application A. This method (known as 'mash-up') makes application richer and more user-friendly, so that they also turn out to be appealing to a broader number of users. The data thus processed may be aggregated again and again according to the users' specific needs. In addition, they can also be looked up in different distribution platforms and in a number of communication devices.

1.2 Usercracy

Web 2.0 is regarded by many as the virtual counterpart of participatory democracy; accordingly, I suggest defining it as a 'usercracy'. From this point of view, user power is part of an irreversible process that – starting from the democratization of Internet and going through the democratization of information – results in the democratization of knowledge as well. To democratize means to grant users the freedom to know, learn and create new contents through all available media without information being filtered by external mediators. In

addition, it also means empowering the whole user community to evaluate the relevance of the data they have contributed to collect, export and share themselves.

1.3 Web 2.0 + E-Learning = E-Learning 2.0

It has already been pointed out that among the main advantages of Web 2.0 is the ability to boost contents creation and exchange. Assuming that exported and shared contents engender knowledge, it ensues that Web 2.0 is an excellent platform for knowledge management and diffusion. These functions of Web 2.0 reveal how closely related this is to the concepts of both E-Learning and Knowledge Management.

Such a close relationship brings into play E-Learning 2.0 (Downes 2005; Bonaiuti 2006) as well as Personal Learning Environments (Downes 2006). These applications enable the user both to enhance the contents generated "out there" on the web by another user, and to share these contents within learning-oriented thematic communities. Such data sharing practices have the merit of rendering implicit and informal knowledge explicit, thus furthering self-taught learning.

In spite of their similarity, E-Learning 2.0 systems are not to be seen as antagonistic to traditional ones (such as Learning Management Systems or Virtual Learning Environments); rather, they should be considered synergistic to them. The latter systems exemplify the traditional learning model based on the concepts of formalism, institutionalism, hierarchy, roleship, and course structure (opposed to the idea of community) matching groups existing in the real world. Conversely, E-Learning 2.0 systems hinge on the idea of informal learning devoid of institutional roles; they are therefore virtual communities transcending the distinctions of the real world, and in which power is equally shared among all the members.

Traditional E-Learning platforms comply with approaches based on the requirements of the institutions adopting them, rather than on the actual users' needs. The teacher is defined here as someone who owns a superior amount of knowledge, which he/she is supposed to pass on to the learner lacking it (Kozlowski, 2007). In this model, knowledge stream is exclusively unidirectional, i.e. from the teacher to the learner: such an unbalanced transaction is due to the different amount of power their roles grant them. This gap entitles the teacher to decide what portion of his/her knowledge he/she wants to 'administer' to the learner, as well as how to do it. So far, E-Learning systems have followed this model of knowledge transposition, also known as 'Nurnberg Funnel' (Ninck 2003) or as 'push' (Trentin 2005), because the teacher literally pushes knowledge onto the learner, who is a passive receptacle of information.

In other words, thanks to the concept of E-Learning 2.0 we have moved from formal learning – which Jay Cross has compared to a bus driving the passengers to a destination chosen by the bus driver only – to informal learning, which can be compared to a car (Rapid Informal Learning) or to a bicycle (Deep Informal Learning) (Cross 2006), as they both grant passengers their independence.

TABELLA

Comparison between Virtual Learning Environments and Personal Learning Environments

	VLE (Virtual Learning Environment)	PLE (Personal Learning Environment)
Roles	Asymmetrical and clearly distinct roles (teacher = sender, learner = recipient)	Symmetrical and not clearly distinct roles
Communication	Unidirectional	Multidirectional
Power	The teacher holds the power	The power is equally shared among participants
Definition of Learning Goals	Goals set by the teacher or by an institution	Goals set by the learner (the teacher might help set a learning agenda, but then this would be not-binding)
Evaluation of Results	The teacher evaluates the learner's progress according to a set of personal criteria	Learners self-evaluate their own progresses
Type of Community	Communities are structured as courses, which are hierarchy-based; therefore, they are closed and pre-established by the institution/teacher	Communities lack a hierarchical structure; they are therefore open and learners are allowed to set their own learning goals and self-manage their activities
Tools and Services	Limited (as they have been set in advance by the teacher or the administrator)	Unlimited, optional and shared
Area of Use	Clean-cut distinction between educational /non-educational experiences as well as between life and learning	Life Long Learning
Period of Use	Limited to the student's physical participation in the learning activities of an institution	Theoretically unlimited, regardless of the institution they belong to
Role of The System	They aim at supporting a process which is already underway	They aim at phasing in a new learning process in expansion mode

Educational Approach	Formal	Informal
Method for Transmitting Knowledge	'Push'	'Pull'
Structure	Hierarchical	Non-hierarchical

2 Peenv (PErsonal lEarning ENVironment)

In this chapter I am moving from theory to practice through the development of the learning application PEENV, which has been named after the acronym for Personal Learning Application. The application I have developed has three goals:

- To create a learning environment enabling virtual meetings to take place. Since in these meetings participants share their knowledge, the system turns out to be a repository in which information previously scattered on the Web may be collected, shared, managed and even enhanced through the creation of communities and tools for assisting interaction among learners.
- To create virtual communities which have no correspondence to real learning groups (in which group members gather in the same physical location).
- To create horizontal (rather than vertical) power relationships avoiding the traditional dichotomy teacher vs. learner.

The 'aggregative' task PEENV is expected to carry out is the mainstay of the project. In effect, since the Web is overflowing with data, it is sometimes so difficult and time-consuming for a user to retrieve and organize them that they are forgotten about, or else go lost (Lubensky 2006). PEENV – and, more in general, Personal Learning Environments – has been devised for simplifying information management by means of tags and social bookmarks. PEENV's aim is – among others – to demonstrate the efficacy of these mash-up processes: this would mean facilitating learning without developing new applications, as it would be possible to use all those easily accessible applications which are already on the Web. In effect, it would be useless to create new blogging, file management or image storage platforms, owing to the massive presence of analogous services existing on the Net.

On registration users will be requested to specify both their account details and their blog RSS address in a series of external Internet services. A function implemented ad hoc will later check data entries on a regular basis, and will accordingly populate a specific table in the application database.

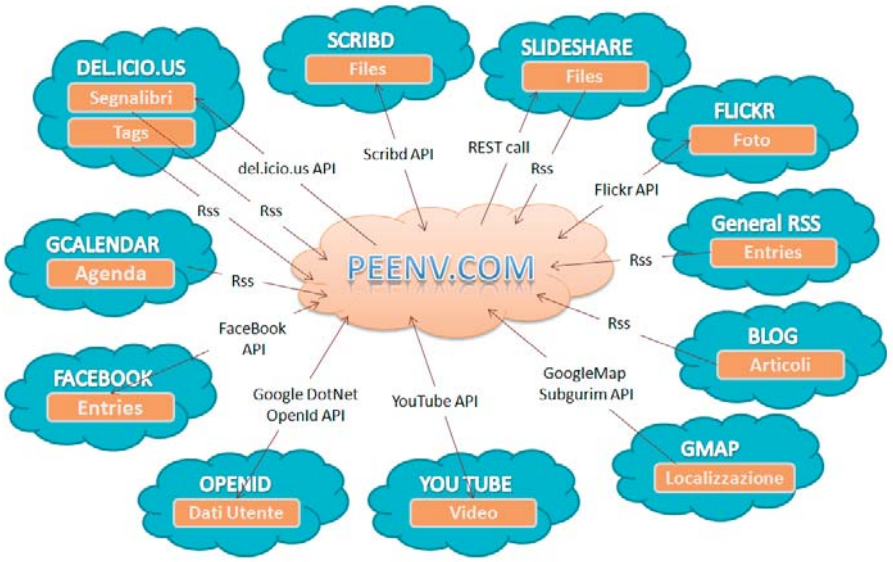

Fig. 1 PEENV Environment and its Aggregations; Picture Suggested by Wilson et al., 2006

2.1 The Issue of User Identification in Learning 2.0 Systems

Generally speaking, in Web 2.0 environments we may have two distinct situations related to the issue of user identification in the system.

The core business of applications that are purely social networking (such as Facebook, LinkedIn and Xing) is merging virtual and real worlds. In effect, in these applications users aim at exporting into the virtual world their real network of relationships, or else at expanding their real network by means of virtual contacts. In these cases users are not interested in remaining anonymous, and it couldn't be otherwise; else, the very function of these applications would fail.

The situation is different in Web 2.0 systems which are characterized by more generic User Generated Content features, as it is the case of You Tube, Flickr or LastFm. The core business of these social networks is some common interest users share in virtual reality. As a consequence, the relationships they establish do not correspond to pre-existing ones in the real world, and – for this reason – users need not share their profiles and commonly opt for made-up nicknames.

As for PEENV, it has been devised as a Trust Application, that is to say, an application in which users are required to register with their real names. While registered users will be allowed to see members' full names, external users will

be only allowed to see members' first names.

However, an identification problem peculiar to E-Learning Systems has recently been detected. A common feature of many among the most popular social networks is age homogeneity of user population; in addition in these networks users usually establish friendships. By contrast, in E-Learning Systems it is unavoidable for different hierarchical strata of the real world to meet and interact. So, a student, a teacher or a tutor – although endowed with the same rights in the virtual community – play different roles in real life, and this power gap inevitably influences virtual interactions, too. A viable solution to this problem may be to give users access to some services without their true identity being displayed to the rest of the community.

2.2 Application Functions

On registration, users – besides entering their data in the application – will choose some keywords describing themselves. System users can found communities (but they cannot own them), and – as soon as they decide to create one – they will choose a name and a set of keywords describing it.

Users are allowed to upload files into the system either indirectly (files associated with a user are imported into the system depending on the options selected on registration) or directly (files may be entered from the system into a user's account in an external service provider). The system enables any user to select a file and bookmark it; in addition, he/she can also recommend it to the community he/she is a member of. It also enables users to create personal networks by bookmarking their favourite contacts, and makes possible for any user to post his/her comments to blogs as well as to comment on files.

It will be possible for users to look up in the user section the communities they have subscribed to, the contents they have generated in the Web, and the contents uploaded to the system by the contacts of their personal network. Moreover, any user will be able to find out those members who are most proximate to him/her, and this regardless of any direct relationship already established with them. The degree of proximity is evaluated on the basis of a comparison between personal tags, community memberships and bookmarked files. Finally, not only is it possible for users to find out members which are proximate to them from the point of view of the profiles; they can also find out members who are geographically proximate to them. In effect, users will be enabled to look up the contents generated by other community members as well as to find out their geographical location.

There are three types of files that can be associated to a given community:

- files belonging to or generated by community members;
- files in which at least one keyword matches the community's;
- files community members have collectively "adopt".

The former two types are subject to an automatic process of selection; by contrast, the latter files are selected providing that 30% (as a rounded-down percentage) of the community accepts the file recommended by another member. Communities cannot be shut down; they die out the moment when the very last user unregisters from it.

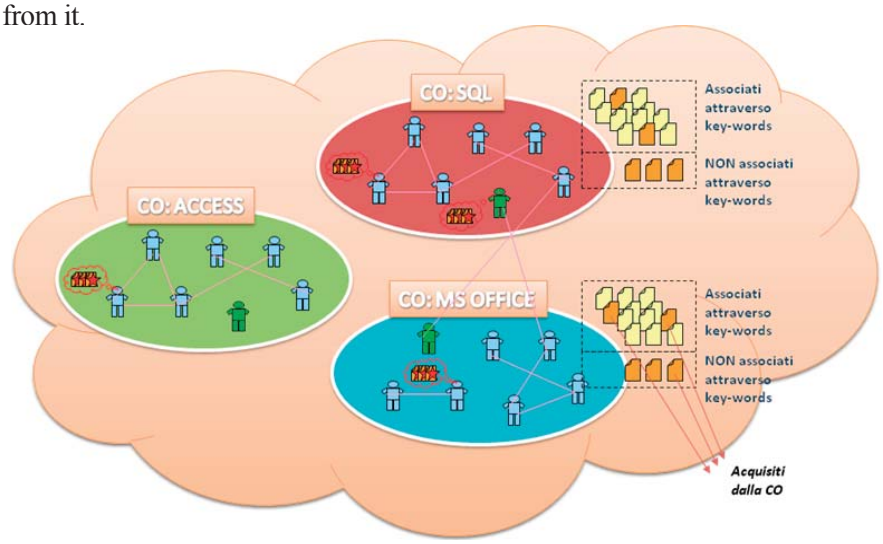

Fig. 2 Visual Representation of the Way a Community Works

2.3 Conclusive Remarks and Prospects for the Future

Although the theoretical development of the system has been nearly achieved, it still needs testing with a view of detecting potential malfunctionings or deficiencies.

Among the problems still unresolved is the community keyword management, as keywords may need changing or increasing after a new community has been created. It is therefore necessary to issue a rule that will require any user to seek the majority of the community's prior consent before adding or removing a keyword.

Another problem awaiting solution is the need to mark some communities as representative of some institutions. For instance, an institutional entity such as the "Database Course" of the Internet Economics Degree course of the Faculty of Economics of the University of Trento could be associated to "MySQL", "XML" or "Access" communities, and other institutions may later join these same communities. Moreover, each user affiliated to an institution would be directed to the communities representative of that very same institution.

Finally, one last problem to solve is the proximity between users, which is currently evaluated on the basis of variables considered as if they were all on an equal

footing. By contrast, differentiating the value of these variables (i.e., tags describing the user, community memberships and bookmarked files) is a matter of great import for the future development of this application. In addition, it is necessary to ponder on the problems – much more difficult to tackle than the differentiation of variables – arising from semantic opacity. For instance, if a user A is registered in "Windows XP" community and adds "SO" to his/her tags, he/she will not result to be proximate to another user B registered in "Windows Vista" community and having "Operating Systems" among his/her tags, although – as human reasoning can easily understand – these two users may be classified as very proximate to each other. This problem is rooted in some still-unsettled issues concerning information retrieval techniques, but it may probably be curbed thanks to PEENV basic assumption that there are further elements to take into consideration when evaluating the proximity between users. To quote the above example, user A and user B will probably both belong to the "Office" or else the "PC" community.

3 Conclusions

E-Learning can and must respond to the spur of the many and manifold new applications circulating in the Web.

We have already highlighted the broad range of information and materials Internet offer to whomever is interested in using them for increasing his/her own knowledge. Web 2.0 – thanks to its social networks, its virtual communities, its blogs and its file sharing platforms – seems to be a natural macrosystem for knowledge management and circulation, as well as for the development of that collective intelligence that «is spread everywhere, continuously enhanced, coordinated in real time, leading to an effective mobilization of competences» (Lévy 1996).

E-Learning environments are therefore supposed to play the role of 'gleaners' collecting informal (and often implicit) knowledge generated haphazardly in the Web; in addition, they are expected to stimulate the creation of networks and the development of thematic virtual communities hinging on specific topics where this knowledge can be shared. For the time being, Personal Learning Environments seem to be – at least theoretically – the applications in which these expectations are more likely to be fulfilled.

However, the emphasis that is presently given to environments enhancing informal learning should not overshadow traditional electronic learning applications, which continue to perform the function of transmitters of institutional and formal knowledge.

The present study – along with the development of PEENV – has served the purpose of focusing on the potential of Personal Learning Environments, as well as of disclosing new perspectives on knowledge diffusion and management that can be implemented through institutional entities.

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