LEARNING ENVIRONMENTS AND SOCIAL APPLICATIONS: WHAT'S NEXT?

ANDREA MOLINARI

Dept. of Industrial Engineering, University of Trento (Italy)
Lappeenranta University of Technology (Finland)
E-mail: Andrea.molinari@unitn.it

Abstract - The paper presents the long-term experience of using learning environments like Learning Management Systems under the constant pressure and competition of social media (like Facebook, Tweeter, Instagram etc.) used for what they are not, i.e., educational tools. Our Laboratory of the University of Trento has developed some educational services for internal usage, and we recently managed the evolution of the system towards a new approach oriented to the creation of virtual communities. This approach is, at first sight, quite similar to social media communities, specifically when they are used to support day-by-day learning activities, especially in those organizations that do not have resources and competencies to manage an LMS by themselves. We will introduce the problems related to the integration of these two different logics into a single environment (learning spaces and collaboration through social interactions), and how to provide those elements of social media that are needed in learning environment, without forcing people to jump from one platform to another. We will describe the developed solution, together with some implications of these choices onto the system, named "On Line Communities". The system presents the idea of virtual communities as pillars of the interaction mechanisms provided by the platform to the users. This revealed, in our opinion, on one side the limitations of tradional LMS, and on the other side, the inappropriateness of social networks as platforms for supporting learning activities.

I. INTRODUCTION

The Learning management systems (LMSs) are normally used by educational institutions to manage their training activities. These systems use the network to create different learning environments related to the learner needs (distance learning, blended training, back-end activities management related to training processes, etc.). As any other type of management system, these applications are also connected to the management model that is represented in the software. In the case of e-learning applications, the represented model is the way by which the institution conceives its learning / teaching processes. The simplest model is the one used in distance learning, when the system becomes a container of learning objects, designed to be effective in the students self-learning processes, the remote control of the current level of learning, the certification of the results achieved and the management of the organizational / financial relations with the training institution.

Much more complex are the systems oriented towards a blended approach. In this case, the LMS offers a virtual space corresponding to what is carried out in the real didactical institution. In this way, the student learns not only in the traditional courses (in the classroom) but also using the virtual space as a reinforcement to face-to-face lectures. This model is the most widely used by the academic institutions. More complex are the systems that tend to support innovative forms of learning such as learning by project, learning by problem and cooperative learning. In this case, the LMS must provide not just a virtual space associated with a course but also special virtual spaces able to work with other similar environments. The section 2 of this paper shows, referring to two systems that are designed, implemented and managed by us, such as the shift from an LMS based on metaphor of the Course to one based on the metaphor of the Virtual Community can produce significant changes in the architecture of a LMS.

The LMS evolution from simply content containers to real cooperation spaces is now in a new phase of transition. The spread of Web 2.0 applications provides the possibility for these systems to evolve and support all those forms of learning excluded from the classical formal and institutional learning methodologies. It is banal to note that the interrelationship between formal and informal learning includes new challenges to the educational institutions and also to the change of the LMSs' architectures. In this paper we present the solution that we are studying in this moment, and the object of a technological integration between the e-learning processes and the current aspects of social networking.

The paper is organised as follows: in the first part we will describe the LMS developed for the University of Trento, named On Line Communities, and its evolution from a e-learning system based on the metaphor of course to a more complex virtual environment based on the metaphor of virtual community. In the second part we will introduce the current study of our research group directed to the integration of the social networking aspect into our environment. In particular we want to underline the

risk of a direct adoption of a social network logics into an academic environment, and what could be the correct strategy for the integration of the two types of approaches into a "bridge" platform.

II. ON LINE COMMUNITIES

In the academic year 1999/2000 the Faculty of Economics of the University of Trento decided to have a software system able to enrich its traditional teaching as an extension on the Web. The first aim was to settle the increasing number of teachers' personal web pages into a single platform. To pursue this result it was necessary to have a Learning Management System (LMS), capable of supplying a virtual environment able to support the educational courses of the Faculty. The resulting system started to function from the second half of 1999 and during this period, the system counted approximately 1,200,000 accesses and online satisfaction surveys showed a very high level of user satisfaction. Being a quite traditional LMS, in 2002 some observation convinced us to redesign the software:

- The needs for cooperation within the academic environments is extending to all the activities that constitute the context in which didactic takes place, not just to the specific "lecture";
- Models of teaching / learning (such as learning by problems, learning by projects, cooperative learning and their combinations) can hardly be connected to the e-Course, especially when the software directly represents the metaphor of traditional courses;
- The organizational didactic scenario changed with new regulations made by academic institutions, and these changes inevitably reflected on the LMS functionalities. It is important to note that these types of changes are usually the result of a debate process in which both elements of cooperation and negotiation interact;
- The didactics of an university are not built only as a set of studies and tests, but these activities are inevitably intertwined with the university's organization and its information system;
- In an academic context, not everything concerning teaching: for example, the entire faculty is more than a container of degree courses and a degree course is more than a container of lessons.

To answer these (and other) needs, another founding paradigm was need, with at least three basic characteristics:

1. Generalization respect to educational settings;
2. suitability to support cooperation processes;
3. capability of modelling and preserving organizational structure and roles of the educational institution.

This new way of conceiving the collaboration platform was found in the concept of virtual community. The system that arose, called On Line Communities [1], was born in 2003 and runs in February 2005. The collaborative approach [2][3] is a very strong incentive for us to develop On Line Communities; the philosophy that led us to rebuild the system is to allow the exchange of users' experiences within a virtual environment, and within well-defined areas known as "communities". This approach is very different, for example, from the traditional ones available in other LMSs. Our work started before the boom of web 2.0 [4], that has now invaded and changed the way people think and build services on the net. The main characteristics of a community could be summed up as follows:

- Each Community offers many services to registered users that have different roles/permissions inside the community
- The services are general applications that enable the users to communicate in synchronous and asynchronous way, to publish contents, to exchange files, to coordinate events, etc.
- Services offered by a community are activated by a manager of the community according to the needs, and the users of a community can use them with different rights and duties.
- Rights/duties in the community are different from rights/duties for the services
- Communities can be aggregated into larger communities with hierarchic mechanisms and infinite nesting levels. Communities can also be aggregated in an arbitrary way into larger communities disregarding the possible position of a hierarchical structure, in a sort of "transversal" link that overcomes the concept of "hierarchy" and follows the idea of "mesh". Thanks to these features, a complex but powerful mechanism of propagation of services/roles/permissions/ rights/duties can be set among communities of the same branch or of different branches.
- All users are recognized by the system and by the community: people external to the system can see public part of the community (services, material, contents etc.) only if managers allow this (ex. a blog of one community could be opened to external contributions)
- Services can take advantage of the "mesh" structure of Online Communities to provide some interesting though non-existing features, like "transversal wikis", or "merged blogs". One blog, in fact, can be the "fusion" of all the blogs

of children communities, or a wiki can take the definition transversally from all wikis in related communities.

- Last but not least, a VC is the container for collaboration processes not limited to educational activities, but for any collaboration activity needed in an organization. Research teams, recreation groups, friends, meetings, conferences, secretariats, board of directors, colleagues, next social dinner, anything could be an aggregation of people around a scope that can take advantage of the virtual spaces offered by the Virtual community.

The core of the application is composed by some abstract entities, i.e., VCs as aggregation of people to which some communication services are available in order to obtain certain objectives. With this approach, it could be possible to represent all the hierarchical relationships between different types of educational communities (such as Faculties, Didactic Paths, Master Degrees, Courses, etc.), as any other relationship among communities inside organizations.

III. LEARNING AND SOCIAL NETWORKS: TWO STRATEGIES INTO A POSSIBLE ARCHITECTURE

If we look at the whole range of application fields where we are using On Line Communities, the platform clearly evidences its nature of a collaborative environment that wants to stimulate the participation and put to value users' cooperative work. Today, with the advent of new communication and collaboration paradigms, On line Communities has become an example of a computer support cooperative work system (CSCW) dedicated to teaching/learning. In recent years, we extended our system to functionalities and services typical of what users fid in social media every day. However, some relevant differences exist between the approaches used by social media and the ones used in On Line Communities. To overcome these differences, a changing of the rules used in the virtual space is required, and these changes have a direct influence on the entire architecture of the system.

The cooperative virtual space of On Line Communities is actually a closed environment. The users participate to the activities inside the system directly with their real identity. In fact, a person who enters a virtual community of our system is authorized firstly by the platform administrator (for certifying user's credentials), and after by each community administrator for each community the user wants to enroll with. Once the user is accepted inside the community, from that moment he/she is automatically in contact with all the people inside the community. This is the pillar of the virtual community: I'm in the community because I share its scope, and all the people of the community have more or less the same interests / objectives / tasks. These are exactly the reason why these users are enrolled in the community. Following this logic, the user is not forced to declare, accept, or manage his / her contacts inside that community: s/he will never have to face the "domino" effect of most social networks, where you will be connected to a friend of a friend of a friend. Of course, On Line Communities allows each user to manage friends' lists, but this is different from managing community members. The differences between "friends" and "community members" are very precise and marked, and the user is allowed by the platform to manage these two different concepts.

Given that the increase of social interactions is not a negative aspect in principle, the risks deriving from the direct use of the most used social network approach (like for example the approach used by Facebook [5]) into an environment with different aims are very high. According to some recent statistics [6], the majority of users who use the so called "social networks services" are concentrating on the well known "peoplesurfing": navigating into the friends' profiles, look at pictures, personal information, etc. We are aware of the clear phenomenon that is emerging from friends' social network [7]; it is true that the action of adding a person to the friends' list requires an approval, but it is also true that a user can see at any moment the people connected to his/her friends; a critical consequence is to become implicitly a friend of my contacts' friends, thus starting a sort of recursion in the friends' list of friends.

The circumstances that we consider favourable in our system (lack of anonymity and control of the external accesses) have origin in two explicit requirements of our Faculty of Economics. The exclusion of anonymity is the result of a belief, that normally indicates that the anonymity into virtual learning environment should be banned, so that the actors cannot shirk from their responsibilities. The second circumstance (access control) stems from the will of a substantial number of teachers to block the publication on the network of their own courses' Learning Objects. These choices made the system impermeable to the users' social dynamics, or to the communities existing in the social networks.

To overcome these limits without affecting our constraints requires a radical change of the system architecture, that sees the person as a member of one or many communities. On the other hand, in social media, the participants exist as individuals who, for example, can create themselves a specific community. The rethinking of the system with these ideas, could change our community system to a sort

of "community 2.0" system: we like to define it as a "Private community Environment" (PCE). The difference between the two approaches is that the communities in our systems are created as an extension in the virtual space of real didactics. On the contrary, in social networks, virtual communities emerge from the interaction among users' own networks.

Following this line, we studied how to modify the architecture of our system, as we wanted to implement the good part (from our perspective) of the incredible revolution introduced by social networks. We wanted to transform our virtual comunities platform into a sort of bridge system between the classical methodology followed into the most famous LMSs (like for example Moodle [8]) and the new social networks applications (like for example Facebook, Twitter or Instagram), without losing the focus on the learning processes.



Figure 1. On Line Communities as a bridge between two different approaches

The architecture that we developed has two fundamental goals:

- As we have said, to make our system more permeable to all experiences that take place inside the web, including applications for social networking;
- Keep control, up to a certain level, of the actions taken by users of our system. In fact, our context is connected to learning environments / academic settings, and not directly to leisure time.

Following these approaches, many drastic changes have been introduced into the platform, moving the focus from "community" to "user". As an example, when the user connects to the system, the user' personal home page and its services are presented, trying to create a real Personal Learning Space (PLS).

We are imagining the new users' Personal Learning Space as an aggregation of two distinct environments. The user will be free to decide what part of his/her relations and contents to import (into On Line Communities) or export (to social networks applications). From a technological and management point of view, this approach presents more problems than solutions. This solution also required a strong review of many parts of On Line Communities, and in particular the management of users' roles and permissions.

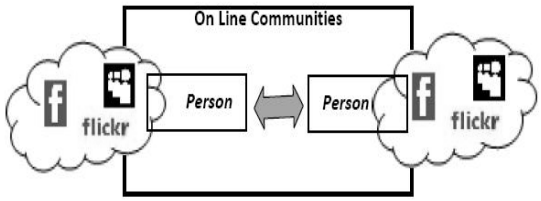


Figure 2. The representation of the new architecture

This approach has different values, in particular regarding the teaching strategies; in fact exporting the contents outside an e-learning platform could accentuate the social role of the educational institution as a source of knowledge and of better didactic practices.

On one side, this solution give to the user more freedom than into a classic LMS, but on the other side, it is more difficult for didactic institutions to be implemented. In fact, while the institutions are becoming a knowledge center through the participation of its members, at the same time they are being exposed to the risk of the complexity and the personal relationships of its members.

According to this solution, it is important also to develop a new interface of the Personal Learning Space of each user; the metaphor of community makes possible to implement some interesting features, directly connected to the user and his/her list of contacts. In other words, this gives the possibility to the users to manage their own learning spaces: in some way to enable the users to create a "Personal Learning Space" for their needs. Each user will have the opportunity to access to his/her personal page, which will contain personalized services. As a result, some interesting new services can be provided, for example:

1. access to communities where the user was registered;
2. view the most used services by each user;
3. access to contextual services for each community;
4. access to the personalized services;
5. add some services into the personal learning area.

The user can access to the list of communities where s/he is enrolled in, because this is the primary scope of connecting to this system. But together with this, the user finds a set of services that are typically connected to his/her own person, a sort of personal space within the system. The services are "general", so in this condition the user will see services that are at "personal" level[10]. This can be repeated and nested when the user enters inside a community: he will find (more or less) the same services, but this time these will be the services of that community,

with different permissions, roles, list of contacts etc. A typical example is the Blog service: when I'm inside my PLS, the Blog is my blog, whem I'm inside the community "workgroup XWZ", the service Blog refers to the blog of that community: same service, totally different context and contents, totally different the role of the user could be. Finally, thanks to the inheritance mechanism among communities provided by the platform, the blog of that community can be merged with the blogs of parent community/ies, or with the child communities, or with sister communities (children of the same parent community).

CONCLUSION

In this paper we presented the evolution of our first e-learning platform, named On Line Courses to a new system based on the metaphor of learning virtual communities, named On Line Communities. As the evolution of the first system from the e-course metaphor, also the rethinking of the current virtual communities platform to a more "social" approach needed an important rethinking of its architecture. One of the thoughts that arises from the discussion presented is that the extension of a learning management system towards a collaborative approach is not simply a matter of adding some services (blog, wiki, friends etc.) to a LMS. We experimented the "long and winding road" of architectural choices, needed for taking full advantages from these tools. Moreover, coupling this social media tools with a virtual communities approach, rather than the traditional "course" metaphor, we obtained many advantages in the possible services provided to end users. In particular, it was evident that social applications are profoundly different from what is provided by traditional e-learning applications. Our system, originally followed a logic of blended learning, was also focused on the metaphor of the course. The evolution to a different metaphor (the community), has opened new perspectives, different from anything that can be seen as formal learning. Our new focus on the development of social network services, increasingly common in the worldwide web, seemed to be quite naturally.

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