Technological Platforms for Lifelong Learning Projects: the Dimension of Time

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Key words: Lifelong learning, e-learning, persistence of the contents, virtual learning communities

Abstract

The supplying platforms are one of the technological requirements of every e-learning project. It seems, therefore, quite natural to imagine that these systems, normally known as Learning Management Systems (LMS), should also be usable for Lifelong Learning (LLL) projects without having to re-plan their functionality or up-grade it to a different task from the normal didactics of training institutions such as an university. At the moment our research group is about to construct a new distribution platform that, according to the requirements of the client, will have to support LLL projects. During our work many questions have emerged that make these systems different from a traditional LMS. One of these concerns the question of time. Indeed, an LMS for LLL projects should, by definition, be projected to last in time for much longer periods than what is normally expected of a traditional LMS used in a traditional environment, in theory lasting as long as a human life. Needless to say that a system of this nature is pure utopia. The experience of the last thirty years does not offer a single software system that has remained unchanged for such a long time. In this paper we will propose the actual state of debate in our laboratory concerning this questions while trying, on purpose, to avoid any technicality, keeping the proposal a mere discussion of the requirements rather than of the engineering of solutions. Basically, the paper introduces briefly the project on which we are working and then concentrates on a selection of problems associated with the hypothesis of persistence of the system.

1 Introduction

This work takes inspiration from a project commissioned to the University of Trento by the Autonomous Province of Trento (P.A.T.), currently in the starting phase, which aims at creating a platform for LLL projects[1] in the next three years. More precisely, P.A.T. plans to build a platform with a double objective: preparation for training interventions addressed at primary and secondary schools and construction of training projects aimed at employees of the public administration who work on the provincial territory. In our discussion we want to start from the experience, still in act, of projection, construction and experimentation of an LMS employed in university didactics based on the metaphor of virtual learning communities called Comunità Online (Colazzo and Molinari, 2007).

The system should inherit some characteristics of Comunità Online of which the most important is that of it being based on the metaphor of virtual communities. The latter are seen as the extension into the virtual of underlying social dynamics formed by a real community. But ever since the first discussion we have understood that the future LLL system will have to tackle questions that are normally neglected in the implementation of an academic system. We can group these issues as concerning four dimensions:

- Temporal, concerning the persistence of the system and the training processes in time;
- Social, the platform will be used in social contexts of learning (that is, Lifelong learning) completely different among them and even in conflict with each other;
- Spatial, in LLL projects the place where the learner takes on a most peculiar meaning; let us take, for example, the various learning needs of someone from maintenance or in an emergency, or a tourist in front of a work of art in a museum;
- Anthropological: people who use the system for learning aims could use the platform in very different periods of life; starting with pre-school age up to the end of working life, without exclusion even beyond that limit.

In this work we will concentrate only in the first dimensions, that is the temporal one. We will not face all the problems, but only two about the length:

- Of virtual communities;
- Of learning objects.

For an exhaustive treatment of the theme, we should have taken into consideration at least three more issues, that we will treat in our next works: (a) the persistency of the relationship networks that born in the learning processes; (b) the persistency of the platform as a such and (c) the persistency of the contents.

1 Contract between PAT e University of Trento n. 36672/335

2 Real Communities and Virtual Communities

Real communities, as social structures, have been widely studied by the main authors of sociology. Usually, in sociological literature, the concept of community is seen in relation to the concept of society, where the distinct marks of the two social structures (analytically) are the levels of freedom of the individuals. Indeed, in a community it is possible to observe a higher number of ties than in a society. This is supposed to have an effect on the intensity and extension of the ties in the various spheres of existence and, consequently, results in a lesser level of freedom; in exchange, individuals are likely to obtain cohesion, security and solidarity. Figure 1 illustrates this settings. If there is substantial agreement among scholars of social sciences on this distinction, the differences start in the analysis of the relationship between these two types of social structures.

We only point out that among authors of social studies who have most thoroughly analysed the relationship community vs. society, the different approaches are unlikely to explain the phenomenon of virtual communities in their multiform configurations. For different reasons the approaches of Tönnies (1887) as well as that of Durkheim (1893) and again of Schmalenbach (1961) and finally that of Turner (1975) would not be able to comprehend the entire variety of virtual communities. Much more general is, on the other hand, the approach to the problem of Max Weber (1922) and of Parsons (1937; 1951; 1969). Nonetheless, it is indeed in the difficulty in defining the concept of community that we encounter the first aspect that links it to its equivalents in telematics. In Beamish (1995) virtual communities are seen as a group of people that communicates through instruments of computer mediated communication, that exchanges information on common interest themes and the participants of which are physically in different places.

For Rheingold (1993), on the other hand, virtual communities are emerging social phenomena, while Lévy (1994; 1995; 1999) considers a virtual community as a group of people who correspond among each other through connected computers. Much more complex is the position of Jones (1995; 1997), who separates conceptually the technological structure of virtual communities (virtual settlement) from the social community true and proper.

Finally, in Turkle (1995) the accent is on the community relationships that are seen as free choices based on affinity of interest and non on an unequal relationship of power.

For the purpose of our work, that is essentially technological, we could, in a first approximation, place Virtual Communities in the square in the top left of Figure 1, considering them as an evolution into the virtual of social structures that sociological thought would prefer to put into the category of society rather than in that of new forms of community.

Fig.1 Community vs. Society and Virtual Community vs. Real Community

In a software system dedicated to e-learning applications in academic environments virtual communities coincide with real communities. Meaning that virtual communities are only an extension into the virtual of real communities, usually consisting of courses but also of training paths, of communities of the faculty and of the entire university. If we observe the dynamics of these different forms of communities from the point of view of time and the involvement within it of all participants (lecturers, students, etc.) we can observe that:

- Communities of university courses have a short lifetime, only a few months. They become lively at the beginning of the course and at the end of it usually remain inactive and little visited until the beginning of the following academic year when they changing the almost total number of their members;
- Communities of degree courses have a longer lifespan and they regenerate less rapidly (a total change of the majority of its members is reached only after some years);
- Communities of the faculties have a decidedly longer life and an even slower regeneration. Theoretically they do not have a certain death;
- Communities of a University behave exactly like faculty communities but in general have a longer life[2].

There are, therefore, two main dimensions of these social structures; the persistence of the community as such and the volatility of the members of the community.

Taking into consideration the teaching structures at primary and secondary schools, it can be noted that their organisation is radically different from that based on courses. In the Province of Trento primary and lower secondary schools are organised into structures distributed according to geographical areas, where several primary schools and one lower secondary school being grouped together; in these cases the persistent structure is not that of a course but of a class. In the low primary

2 In the last thirty years at least one faculty in Italy has disappeared, but as far as the authors know, no university.

persistence is less (courses in fact last three years) just as volatility, but the didactic organisation follows the subjects taught. A similar structure can also be found in the upper superior schools.

We can easily associate virtual communities and real communities such as the classes and imagine services diversified per level (primary, lower secondary, upper secondary). Finally, in secondary schools it is possible to apply at the same time the metaphor of virtual communities in a transversal way similarly to communities formed by the class: for example, communities can be formed by school subjects offered to students interested in furthering their own knowledge.

Leaving the institutionalised teaching environment, literature offers other types of communities according to practice, interests and purpose.

A community of interests (Gero and Maher, 2001) the persistence of the community as to its participants is on average high, for the interests connected also to the personal sphere of participants. On the contrary the variables of volatility and persistence of a community of purpose (Warren, 1996) are strongly dependent on the life of the community; once the final objective is reached it is possible that the users will no longer be actively involved, concluding the experience of the community itself.

Every type of community so far described has, therefore, a different degree of persistence as such and its members participate in a more or less active way according to the degree of interest and the marginal utility that each has in participating. We can place every type of community on a hypothetical graph, see figure 2, in which the axes are represented by the degree of persistence and the volatility of the members who participate in any single community.

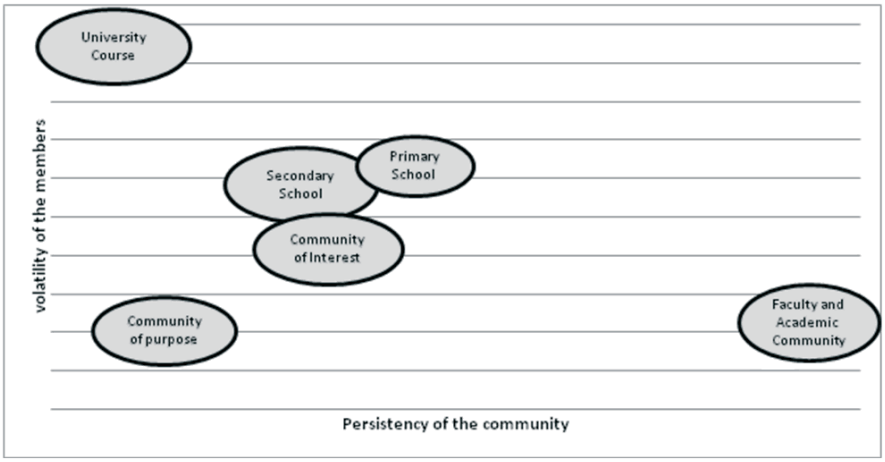

Fig. 2 Degree of relationship between persistence and volatility of members of different communities

4 The Persistence of Electronic Contents

The content of an electronic device is an abstract concept exactly like the concept of text. Like a text, the content can be subject to infinity of reifications and, like a text, content can be transferred from one support to another. This technological possibility of copying of a text makes, for instance, possible the reading of an antique text without the need to consult the original vellum on which it had been written.

Therefore, we have to clearly distinguish the persistence of the content that depends on the meaning and the usefulness of the learning object, from the persistence of its electronic reification. As already mentioned, in this paper we only want to deal with the second question, but we can observe that some contents last for centuries remaining unchanged through a thousand of reifications. This is the case both in the field of humanistic studies as well as scientific ones like, for instance, in the case of Omero's Odyssey or the Pythagorean theorem. An electronic content has, however, other characteristics; it's nature creates the problem of its persistence or, if you like, of its conservation. Indeed, it is known that any electronic content in order to be usable needs a specific technological context. This context consists in a hardware, a hierarchy of software systems without which the electronic content cannot exist and a memory support that needs a specific device.

In other words, an electronic content can only be used in the presence of a hardware and software system that recreates the technological state in which it had been produced. It is as if in order to read the writing on an obelisk we needed to recreate the technological context of its creation. A good part of the problem can be solved through the creation of a virtual machine that simulate a computer of the past; this technique is known as the realisation of different virtual machines on one real. This had been perfected in the sixties / seventies, widely employed on the big IBM systems of those years; today this technique is greatly used. It is to be noted, however, that not all problems are solved, for example that of the support: the problem of permanence of the digital artefacts appears, therefore, to be limited by technological constraints of a different nature. (Ronchi, 2006). We can attempt to design these constraints through hierarchy. Among these the constraints of the hardware and of the operating system can be overcome, as we have seen, through the technique of virtual machines. On the contrary, however, the mechanical constraints, derived from the I/O peripherals are difficult to overcome since the units necessary for recognising the electronic representation cannot be made virtually.

Another type of limitation is linked to the long life of the supports; as opposed to the configuration of the holes on a punched card that continues to persist and, therefore, it is theoretically possible to obtain the exact information

by transcribing the content of a pack of punched cards, the same is not true for magnetic registrations that lasts only a few years.

The supports themselves are constricted, especially when trying to adapt hardware to the new requirements through their reuse, also because of the high value of its physical components. With the years an opposite situation has arisen; the price drop of the electronic equipment and the supports themselves have made their substitution cheaper. In this passage one part of the electronic contents has probably gone lost forever, at least what has not been transferred in good time. Similarly to the supports, the formats of the information containers, that is the files, have changed. With the passing of time these formats have modified themselves in order to guarantee the so called "ascending compatibility". In some cases it is the entire application that becomes obsolete and therefore there no longer exists a software capable of reading that format. For example, s/he who towards the end of the eighties created lessons through Guide software, today perhaps still have the contents but the accessing application has disappeared from the market. Let us not forget the constraints deriving from the file system used: some of them are extinct. The history and the rush for technological changes does not appear to offer a great future for modern file systems either, such as FAT32, NTFS, EXT2, EXT3, UDF and so forth.

In conclusion, there are a series of constraints deriving from the loss of knowledge concerning techniques in using the software, to which the GUI interfaces have contributed. We believe that there are few people left still capable of switching on a PDP11 of the DIGIAL and making it work. [3].

The question of the short life of electronic contents becomes relevant for the future: indeed we have no certainty that the digital material we are creating now can still be useful in say ten to twenty years time. e-learning literature has at length dealt with possible solutions of the problem of the re-use of learning Objects (LO); indeed constructing an LO is very expensive but its massive usage manages to pay off the final cost.

In order to obtain this result standards have been created (SCORM, for instance) with which to enrich LO with metadata that make its reuse easier. But metadata itself are digital and do not solve the problem of permanence even if becoming important in cases of evolutionary permanence. LO persistence makes it possible to put the concept of reuse into a different light; however much an LO may have been created for being reused this will not be possible over a long period. It follows, therefore, that didactically persistent content will have to be periodically reificated, translating it from one technological state to another.

3 The PDP/11 of DIGITAL had in the mid-seventies been the most popular mini-computer. The DIGITAL after a prestigious history no longer exists today.

5 A Partial Conclusion

It is not easy to reach definitive conclusions on the question that we asked ourselves at the beginning of this work but a partial one is possible. A true Lifelong learning project and not only a sequence of training interventions of professional retraining cannot be created without a training institution that guarantees its permanence, the permanence of its communities and its didactic material. From this point of view universities have a most enviable advantage.

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